

Cancer in South Dakota 2000

South Dakota Cancer Registry
Department of Health
October 2003



Cancer
in
South Dakota
2000

South Dakota Cancer Registry, South Dakota Department of Health

PREFACE

"Cancer in South Dakota, 2000," is the ninth annual report from the South Dakota Cancer Registry (SDCR) in the South Dakota Department of Health (DOH). The report contains data of South Dakota residents who were diagnosed with cancer during 2000 and data on those who died of cancer during 2000. The SDCR is situated jointly in the Office of Data, Statistics and Vital Records in the Division of Administration and in the Office of Health Promotion in the Division of Health and Medical Services.

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Acknowledgements

The 2000 cancer database is the result of collaboration among many sources: American College of Surgeons approved cancer centers, federal facilities, pathology laboratories, other South Dakota hospitals and other states where South Dakota residents are diagnosed and/or treated for cancer. South Dakota's mortality data came from the Office of Data, Statistics and Vital Records in the DOH. The SDCR acknowledges and sincerely appreciates all cooperation.

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SECTION 1
SUMMARY
TECHNICAL NOTES

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SUMMARY

Cancer registration in South Dakota during 2000 was neither statewide nor population based. The South Dakota Cancer Registry (SDCR) is presently in transition from a limited data collection system to a statewide, population-based registry. The SDCR registered 86 percent of expected cases; therefore, the incidence data in this report must be used with caution. South Dakota rates would be higher, in most cases, with complete reporting to the SDCR. The Healthy People 2010 Objective is at least 95 percent of the expected number of reportable cases. Mortality data for 2000 is complete and therefore, gives more representative information about the true burden of cancer in South Dakota

- In 2000 there were 3,003 new invasive and bladder *in situ* cancer cases, and 1,604 cancer deaths among South Dakotans.
- Female breast, prostate, colorectal and lung/bronchial cancers were the most common accounting for 57 percent of the cases reported and 52 percent of deaths.
- The most common cancers had higher counts in age groups over 50 years and cases increased with age as expected in an aging population. The most deaths were in the 45 to 64 age group.
- Overall, more males than females were reported to the central registry and more males than females died from cancer.
- Lung and bronchial cancers were the leading cause of cancer deaths for both males and females.
- American Indians have twice the mortality rates for lung and stomach cancers when

compared to the national rates for whites and to South Dakota's rates.

- The American Indian cervical cancer mortality rate is approximately six fold the state's cervical mortality rate for whites and the South Dakota mortality rate.
- Trends for the five-year rate change in mortality show increases for all cancers combined as well as for ovarian, female breast, brain and central nervous system, colorectal and non-Hodgkin lymphoma.
- Trends for the five-year rate change in mortality show decreases for cervix and corpus uterine, lung and bronchus, oral cavity and pharynx, bladder, stomach, prostate and melanoma.
- There were 7 cases of mesothelioma reported during 2000.

This report is presented in four sections. The first section covers technical notes. The second section describes cancer incidence and mortality rates for all cancers by county, race, gender and stage at diagnosis for 2000. It also covers aggregate incidence and mortality rates for 1996 to 2000, trends in five year mortality, years lost to premature death due to cancer and information on the economic burden of cancer. The third section describes the selected sites in more detail showing the incidence and mortality summaries, descriptive epidemiology, stage at diagnosis, risks and associated risk factors, some prevention information and Healthy People 2010 objectives if applicable. The fourth section provides information regarding childhood cancers in South Dakota, and causes and prevention of cancer.

TECHNICAL NOTES

Cancer Case Definitions

A “cancer case” is defined as the primary cancer site, i.e., the site where the cancer started. Since an individual can have more than one primary cancer site, the number of incident cancer cases could be greater than the number of persons who are diagnosed with cancer. A metastasis is not a primary site.

Incidence

The measure of new cancer cases is incidence.

Incidence rate

This is a measure of the number of new cancer cases per 100,000 persons per year. In conformity with the National Cancer Institute’s (NCI) Surveillance, Epidemiology, and End Results (SEER) Program guidelines, the incidence rates for cancer sites exclude the following:

- *In situ* cases, except bladder;
- Basal and squamous cell skin cancers;
- Cases with unknown age; and
- Cases with unknown gender.

Age-adjusted incidence rate

Age-adjusted incidence rates published within this report were adjusted using the direct method and standardized to the age distribution of the 2000 U.S. Standard Population (see Appendix A for the 2000 U.S. Standard Population). Age adjustment allows rates for one geographic area to be compared with rates from other geographic areas that may have differences in age distributions. Any observed differences in age-adjusted incidence rates between populations are not due to different age structures. Reports prior to 1999 used the 1970 U.S. Standard Population.

Age-specific incidence rates

Age specific rates are calculated by dividing the number of cases for a given age group by the total population of that age group and are expressed as an average annual rate per 100,000 persons by age group. Age specific rates exclude the same types of cases that are excluded from age-adjusted incidence rates. Reports prior to 1999 used the 1970 U.S. Standard Population.

Age-adjusted mortality rates

Mortality rates are calculated for total cases and separately for males and females. The mortality rates are age-adjusted to the 2000 U.S. Standard Population using 5-year groups, and are per 100,000 persons. Rates are presented for 2000 and for the 5-year period, 1996-2000.

Observed versus expected number of cases

The expected numbers of cases are those estimates in the American Cancer Society (ACS) *Cancer Facts and Figures 2000*. The observed cases are those actually reported to the registry.

Risks and associated risk factors

These were developed using the “American Cancer Society Textbook of Oncology,” and the Harvard Cancer Center, *Causes of Human Cancer*.

Stage at time of diagnosis

Staging is the process of describing the extent or spread of disease from the origin, which is the primary site. Summary staging is the standard used for comparison nationally. In 2000, the SEER Summary Stage 1977 was in effect. Summary stages are defined as follows:

In situ The malignant cells are within the cell group from which they arose, without penetration of the basement membrane of the tissue and no stromal invasion. *In situ* is “in place”.

Localized The malignant cells are limited to the organ of origin and have spread no farther than the organ in which they started.

Regional The tumor is beyond the limits of the organ of origin by direct extension to adjacent areas with or without lymph node involvement.

Distant The primary tumor has broken away and has traveled, growing secondary tumors in other parts of the body. It has metastasized.

In situ and localized stages are the **early stages** of diagnosis. Regional and distant stages are **late stage** diagnoses. An **invasive cancer** refers to a cancer that has spread into surrounding tissues.

Person-years of life lost (PYLL)

The person-years of life lost (PYLL) is calculated as follows: For each individual who dies of a cancer of interest, the number of years of additional expected life for an average person of that age and sex is obtained from life tables for the U.S. population. The PYLL in the general population associated with a particular cancer is the sum of this expectation over all those individuals who died of that cancer in a particular year.

Average years of life lost (AYLL)

This is the extent to which life is cut short due to premature death. This is obtained by dividing the PYLL by the number of deaths. Together with mortality rates, it shows a more complete picture of the burden of cancer. On average each person who dies from cancer loses 15 years of their life.

Behavioral Risk Factor Data

The South Dakota Department of Health, Office of Data, Statistics and Vital Records in conjunction with the Centers for Disease Control and Prevention (CDC) annually conduct the Behavioral Risk Factor Surveillance Survey (BRFSS). The BRFSS conducts approximately 5,000 household telephone interviews of randomly selected

adults age 18 and older to provide insight into the health behavior of South Dakotans. The Youth Risk Behavior Survey (YRBS) and the American Indian YRBS are conducted by the South Dakota Department of Education in conjunction with the CDC, and assess the health behaviors of teenage students. The American Indian YRBS is done among Bureau of Indian Affairs (BIA) schools.

Confidence intervals (CI)

A confidence interval tells how confident we are of the accuracy of the calculated rates. The SDCR uses a computed interval with a given probability of 95 percent, i.e., the true value of the calculated rate is contained within the interval. For example, given a calculated rate of 191.4 and a confidence interval of 182.1 to 200.8, it is better to say that the true rate will fall between 182.1 and 200.8. Of course, we can say with more certainty that it falls near the middle than near the edges. The larger the sample size, the shorter the interval size, giving us more certainty that the rate is correct.

Statistical significance

This determines whether an event happens by chance alone. The null hypothesis states that in a given place and a period of time, all events occur randomly by chance. If not, then there is statistical significance. Confidence intervals are used to test statistical significance in this report. If the confidence intervals of two different rates intersect each other, then there is no statistical difference between the two rates. However, if the confidence intervals do not intersect one another, there is statistical significance. This report looks at the South Dakota rates as compared to the U.S. national rates using SEER data.

Percent change

This measures the change in a rate from one year to another.

Annual percent change (APC)

The annual percent change is the average rate of change in a cancer rate per year in a given time frame indicating how fast or how slowly a cancer rate has increased or decreased each year over a period of years. A negative APC describes a decreasing trend, and a positive APC describes an increasing trend. In this report, a five-year period 1996-2000 was used and the calculations were made using SEER STAT.

Data source

All data, tables and figures come from the South Dakota Department of Health, *American Cancer Society Facts and Figures 2000* or *SEER Cancer Statistics Review 1975-2000* and should be cited as such if taken out of this report in part. All sources are clearly cited.

Disparity

Health disparities are differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States.¹ Health disparities can be defined as a specific group bearing a disproportionate share of negative health outcomes compared to the general population, i.e., disease, disability, and death.²

Limitations to Data Interpretation and Comparison

A number of factors need to be considered when reviewing cancer statistics and interpreting them.

Rate comparisons: When comparing age-adjusted rates and age-specific rates based on fewer than ten cases, rate comparisons are difficult to interpret. In comparing rates among geographic areas such as counties, states and health districts, the absolute numbers and

differences in demographics should be considered, as well as clinical significance of the disease being considered. Data quality indicators for each registry should also be reviewed. Interpretations without considering these factors may be misleading. There will also be differences between mortality statistics published by national agencies and the mortality rates in this report, which were calculated using the South Dakota Department of Health statistics.

Racial misclassifications: When race is not specified in a source document and the default is to record these cases as white or unknown, the results are biased. Numerator error can occur because of misclassification.

Statistical significance: In South Dakota, case counts can be very low; therefore, magnitude bias is inherent with confidence intervals and z-tests. For example, in year 2000, cervical cancer rates were 12.1 per 100,000 American Indian women with 2 deaths and 2.1 per 100,000 white women with 8 deaths, i.e., American Indian women have a cervical cancer age-adjusted rate six times higher than white women in South Dakota. However, the case counts were 2 for American Indians and 10 for whites. Larger numbers result in narrower confidence intervals, thus more confidence in the data.

Early detection/screening: Improved early detection/screening may produce increases in both incidence and survival rates. Increases may occur as a result of the introduction of new procedures. The interval between the time a cancer is diagnosed by a screening procedure and the time when it would have been diagnosed in the absence of screening procedures is called the lead-time. Changes in lead-time for example in breast cancer diagnosis, have led to an

¹ <http://healthdisparities.nih.gov/whatare.html>

² <http://www.cdphe.state.co.us/tpi/healthdisparities.htm>

increased survival and a reduction of mortality.

Changes in diagnostic criteria: Early detection resulting from either screening or early response to symptoms may result in increasing diagnosis in small tumors that are not yet life threatening. This may raise incidence and survival rates but without changes in mortality rates. Cancers likely to be affected are breast, colon, cervix uteri, prostate and melanoma.

Comparison of this report with previous reports: It is important to note when reading this report that rates were calculated using the year 2000 U.S. Population Standard. Therefore, rates in this report cannot be compared to rates and trends in previous reports except for 1999 when the 2000 population data was first used. Reports prior to 1999 used the 1970 U.S. Standard Population to calculate rates.

A cancer registry database is a fluid and dynamic database, therefore, the reported number of new cases in a particular race, gender and age-cancer category may change for the calendar year for which the data have already been reported in a previous publication. Additional cancer cases, that have been previously overlooked for a given diagnosis year may have been found and reported to the central registry. There may also be elimination of duplicate records for the same patient, often due to name changes or spelling corrections.

Staging: Advancement in diagnostic procedures may change in due time. Advances increase the probability that a given cancer will be diagnosed in a more advanced stage, for example, with new scanning methods, metastases can be detected. Therefore, if someone was previously diagnosed with a localized tumor, they may now be staged as distant.

This is called stage migration and can affect the analysis of all solid tumors.

Pathology reporting: Cancer cases identified through an extended reporting system, pathology reports, were included in this year's data without conducting any follow-back with the treating physician or facility. This may have created a slight inflation of incidence.

Surveillance, Epidemiology and End Results (SEER): All of the national data came from SEER *Cancer Statistics Review 1975-2000*. Incidence data represent 10 percent of the U.S. population and mortality data represent the entire nation.

Breast and Cervical Cancer Control Program (BCCCP) The *All Women Count!* Program in the South Dakota Department of Health provides breast and cervical cancer screening in South Dakota to women who meet specific income and age guidelines.

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SECTION II

OVERVIEW

Summary of Cancer Incidence, South Dakota 2000

It is important to note when reading this report that the South Dakota Cancer Registry (SDCR) is in the process of evolving from a limited cancer data collection system to a statewide, population-based registry. Therefore, incidence data does not meet national standards for completeness, which is 95 percent of estimated cases within 24 months from the end of the diagnosis year. The SDCR cannot make any conclusions with South Dakota's incidence rates until the SDCR achieves data completeness. The SDCR suppresses data at less than 3 per cell when presented at county level in order to reduce the risk of identity disclosure of the persons.

All data are current to December 31, 2000. The SDCR routinely runs quality assurance edits to maintain high standards and merges all duplicates. As previously explained in the technical notes, in order to compare with national data and other registries, incidence data is calculated using all new invasive cancers and only *in situ* bladder cancers. The 3,003 incident cases represent 86 percent completeness, based on the American Cancer Society's projection of 3,500 new cases for 2000. The rates are correlated to total population as age-adjusting takes into consideration confounders such as different age groups in different populations. All age adjustments were done using the 2000 U.S. Standard Population and rates are per 100,000 persons.

Table 1 shows the incidence at county level for 2000 and for 1996-2000. In 2000, the incidence rates by county range from a low of 95.7 in Aurora County to a high of 825.5 in Stanley County. Aggregate data for years 1996-2000 show a 321.4 rate per 100,000 persons for South Dakota. Rates range from the lowest of 76.1 in Corson County to 436.5 per 100,000 persons in Haakon County.

Table 1 : Cancer cases and age-adjusted rates by counties, 2000 and 1996-2000

County	2000		1996-2000	
	Cases	Rate	Cases	Rate
South Dakota	3,003	376.4	12,754	321.4
Aurora	4	95.7	29	149.3
Beadle	72	323.9	241	230.1
Bennett	21	704.6	49	323.7
Bon Homme	36	339.4	153	294.0
Brookings	71	298.2	286	247.7
Brown	153	369.2	812	392.9
Brule	21	344.1	93	310.2
Buffalo	7	678.8	17	305.6
Butte	28	278.2	130	259.4
Campbell	4	133.7	19	143.8
Charles Mix	39	341.2	146	265.1
Clark	19	369.5	110	393.6
Clay	43	413.2	181	352.5
Codington	138	507.9	557	413.2
Corson	*	*	13	76.1
Custer	38	401.4	147	316.9
Davison	26	122.7	143	145.3
Day	40	477.5	181	393.6
Deuel	28	437.1	109	352.0
Dewey	10	254.8	47	216.6
Douglas	13	285.6	51	203.2
Edmunds	21	312.0	115	377.5
Fall River	63	543.7	168	285.8
Faulk	15	408.4	74	353.7
Grant	46	443.4	130	268.6
Gregory	28	336.1	117	326.6
Haakon	12	385.7	57	436.5
Hamlin	25	384.3	109	333.0
Hand	21	330.6	58	193.0
Hanson	7	204.2	38	233.3
Harding	8	565.9	19	269.2
Hughes	82	477.7	168	196.9
Hutchinson	43	335.3	215	370.5
Hyde	8	419.7	24	220.8
Jackson	14	512.3	42	308.4
Jerauld	9	239.4	31	164.7
Jones	6	409.7	29	382.5
Kingsbury	30	348.5	130	314.8
Lake	58	449.9	240	374.7
Lawrence	67	276.3	258	218.7
Lincoln	76	367.5	338	324.0
Lyman	14	333.9	47	235.6
McCook	23	333.4	117	310.7
McPherson	14	268.1	98	378.4
Marshall	28	413.7	77	227.7
Meade	62	290.8	266	251.8
Mellette	6	345.2	30	306.9
Miner	14	282.1	63	316.7
Minnehaha	576	436.8	2,821	425.2
Moody	19	264.7	117	331.0
Pennington	339	404.5	1,566	373.0
Perkins	9	186.1	37	144.5
Potter	11	257.9	51	247.4
Roberts	23	191.3	105	176.0
Sanborn	10	306.9	30	183.9
Shannon	30	563.3	103	358.2
Spink	44	441.9	167	346.6
Stanley	22	825.5	36	264.7
Sully	5	253.2	23	240.2
Todd	20	392.0	69	288.4
Tripp	31	349.7	90	218.9
Turner	65	538.2	248	419.4
Union	38	292.2	133	200.6
Walworth	20	236.1	89	199.7
Yankton	94	402.9	450	381.1
Ziebach	8	511.8	19	236.7

Note: Rates are age-adjusted per 100,000 persons
Source: South Dakota Department of Health.

In 2000, reporting of cancers such as breast and bladder cancers exceeded the expected cases, while others, such as prostate cancers and melanomas appear to be under reported.

Access to health care has a definite effect on incidence rates at the county level in South Dakota. Many patients in border towns go to

Table 2: Expected versus observed cases for selected sites, South Dakota, 2000

Primary Site	Expected Cases *	Observed Cases +	Percentage
All Sites	3,500	3,003	85.8
Breast (female only)	400	516	129.0
Colon and Rectum	400	404	101.0
Lung and Bronchus	400	378	94.5
Prostate	600	418	69.7
Melanoma	200	67	33.5
Bladder	100	139	139.0
Kidney	100	81	81.0
Non-Hodgkin Lymphoma	200	137	68.5

Source: * American Cancer Society *Cancer Facts and Figures 2000*

+ South Dakota Department of Health

Table 2 shows the estimated and observed new cancer cases for South Dakota. As noted in the technical notes, pathology reporting may have slightly inflated the number of cases for some cancers. Implementation of a physician follow-back procedure in 2001 will eliminate any inflation.

Many of the prostate cancers and melanomas were not registered, more than likely because these cancers were diagnosed, treated and followed at physicians' offices. The registry does not presently collect cancer cases from physicians.

State and national rates may be compared, to some extent, when looking at age-adjusted rates for individual cancers. The SDCR has collected most of the expected incident cases for some cancers, e.g. breast cancer. Therefore, any evaluation of breast cancer is valid especially when investigating data queries in a perceived cancer cluster.

other states for diagnosis and treatment. These cases will be collected from those states, which have data sharing agreements with the SDCR. However, many persons in northeastern South Dakota counties go to hospitals in Minnesota. Minnesota's law does not allow data sharing thus a number of these cases may not be reported to the SDCR.

The SDCR is working with the Indian Health Service (IHS) to try and better define the cancer burden of American Indians by creating agreements to access all pathology reports from IHS service units.

Table 3 presents age-adjusted incidence rates by gender and race for South Dakota and the U.S. in 2000 for race distribution of South Dakota's population). The low population represented by minorities in South Dakota may be reflected by random fluctuation from year to year in the numbers and types of cancers reported, causing rates for both incidence and mortality to fluctuate considerably from year to year.

Table 3: Age-adjusted cancer incidence rates by race, South Dakota and U.S., 2000

Race	South Dakota Rate +			US SEER Rate *		
	Total	Males	Females	Total	Males	Females
All Races	376.4	419.8	347.7	472.9	460.2	413.8
White	344.5	385.5	317.2	478.9	558.0	426.8
Black	400.9	430.5	348.3	512.4	689.7	394.0
American Indian	407.5	460.0	378.1	Not available	Not available	Not available

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

Race is an important variable for cancer surveillance. However, race and ethnicity are not always reported and are difficult to obtain. Not only are many races reported as unknown, but also many American Indians are reported as white. The SDCR has corrected inaccuracies for American Indians by linkage with the Indian Health Service database. The South Dakota population is changing as more refugees and immigrants move into the state. Correct race reporting would involve training programs for those who actually record race data on the patients' charts.

The Annual Report to the Nation on the Status of Cancer, 1973-1999³ stated that despite the stabilization of cancer incidence rates, the overall growth of the U.S. population can be expected to increase the burden of cancer to our nation. As one ages, the risk of developing cancer increases. According to the 2000 census, 35.5 percent of South Dakota's population was over 45 years old, therefore, incidence would increase. In addition, better screening programs would pick up cancer cases. Nationally, the absolute number of cancer cases in persons aged 65 and older is expected to double within the next thirty years as the baby boom generation ages.

³ Annual Report to the Nation on the status of cancer, 1973-1999, featuring implications of age and aging on U.S. cancer burden. **Cancer**. Volume 94, Issue 10, 2002, pages 2766-2792.

Table 4 presents age-adjusted rates and counts of cancer types using SEER primary site groups (Appendix D) based on International Classification of Diseases for

Oncology (ICD-O-2) codes. Reporting for most of the cancers is incomplete; therefore, rates would be higher than those calculated.

Table 4: Age-adjusted cancer incidence rates by site and gender, South Dakota, 2000

Site Category Categories are aggregated from the groups indented below them	TOTAL		MALE		FEMALE	
	Cases	Age Adjusted Rate	Cases	Age Adjusted Rate	Cases	Age Adjusted Rate
TOTAL for South Dakota	3,003	376.4	1,514	419.8	1,489	347.7
Oral Cavity & Pharynx	67	8.7	49	13.6	18	4.2
Lip	23	2.9	21	5.9	2	0.4
Tongue	12	1.6	5	1.4	7	1.7
Salivary Gland	9	1.2	6	1.7	3	0.7
Floor of Mouth	3	0.4	2	0.6	1	0.3
Gum and Other Mouth	6	0.8	5	1.4	1	0.2
Nasopharynx	3	0.4	1	0.3	2	0.6
Tonsil	8	1.1	7	1.9	1	0.3
Hypopharynx	2	0.2	1	0.3	1	0.1
Other Oral Cavity & Pharynx	1	0.1	1	0.3	0	0.0
Digestive System	495	60.4	258	72.0	237	50.6
Esophagus	34	4.3	31	8.5	3	0.7
Stomach	39	4.8	26	7.4	13	2.8
Small Intestine	12	1.5	6	1.6	6	1.4
Colon (Excluding Rectum)	303	36.5	139	39.0	164	34.4
Rectum and Rectosigmoid	101	12.5	52	14.4	49	10.9
Anus, Anal Canal and Anorectum	6	0.8	4	1.1	2	0.5
Liver and Intrahepatic Bile Duct	102	12.5	49	13.5	53	11.2
Liver	13	1.6	7	1.9	6	1.3
Intrahepatic Bile Duct	3	0.4	3	0.9	0	0.0
Gallbladder	12	1.3	2	0.5	10	1.8
Other Biliary	6	0.7	5	1.4	1	0.1
Pancreas	53	6.6	30	8.3	23	5.0
Retroperitoneum	4	0.5	2	0.6	2	0.5
Peritoneum, Omentum, Mesentery	11	1.4	0	0.0	11	2.6
Respiratory System	414	51.6	244	67.6	170	39.4
Nose, Nasal Cavity and Middle Ear	4	0.5	1	0.3	3	0.6
Larynx	30	3.9	26	7.2	4	1.0
Lung and Bronchus	378	47.0	215	59.6	163	37.8
Pleura	2	0.3	2	0.6	0	0.0
Bones and Joints	4	0.5	1	0.3	3	0.8
Soft Tissue (Including Heart)	8	1.1	7	1.9	1	0.3
Skin (Excluding Basal and Squamous)	70	9.1	39	10.9	31	8.4
Melanoma of the Skin	67	8.8	37	10.3	30	8.1
Skin	3	0.3	2	0.6	1	0.2
Breast	520	66.6	4	1.2	516	125.0

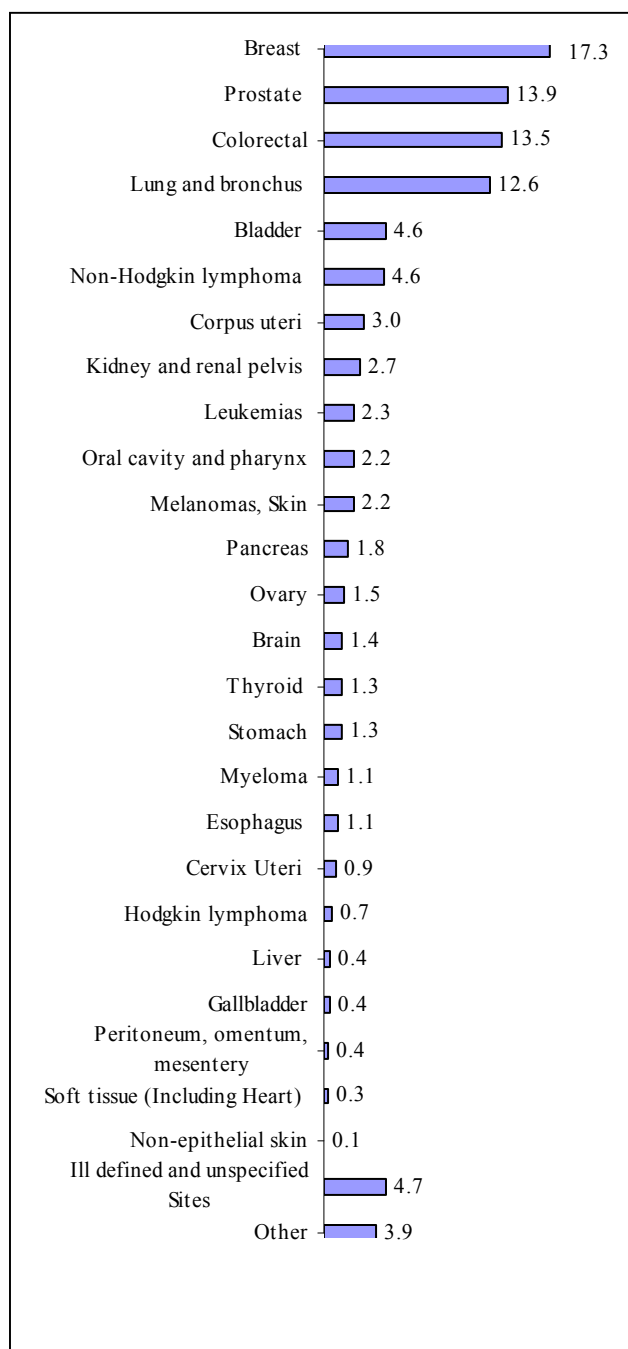
**Table 4: Age-adjusted cancer incidence rates by site and gender, South Dakota, 2000
(Continued)**

Site Category Categories are aggregated from the groups indented below them	TOTAL		MALE		FEMALE	
	Cases	Age Adjusted Rate	Cases	Age Adjusted Rate	Cases	Age Adjusted Rate
Female Genital System	177	43.6			177	43.6
Cervix Uteri	26	6.9			26	6.9
Corpus Uteri	88	21.6			88	21.6
Uterus, NOS	1	0.3			1	0.3
Ovary	45	10.6			45	10.6
Vagina	2	0.5			2	0.5
Vulva	12	2.8			12	2.8
Other Female Genital Organs	3	0.8			3	0.8
Male Genital System	432	119.2	432	119.2		
Prostate	418	115.3	418	115.3		
Testis	10	2.8	10	2.8		
Penis	4	1.1	4	1.1		
Urinary System	222	27.5	160	44.5	62	13.9
Bladder	139	17.1	115	32.0	24	5.3
Kidney and Renal Pelvis	81	10.2	43	11.9	38	8.6
Ureter	2	0.2	2	0.6	0	0.0
Eye, Brain and Other Nervous System	46	5.8	24	6.6	22	5.1
Eye and Orbit	4	0.5	3	0.8	1	0.2
Brain	41	5.2	21	5.8	20	4.8
Meninges, Cranial Nerves and Other Nervous System	1	0.1	0	0.0	1	0.2
Endocrine System	42	5.6	14	3.8	28	7.3
Other Endocrine	2	0.2	2	0.5	0	0.0
Thyroid	40	5.3	12	3.3	28	7.3
Lymphomas	157	19.8	92	25.4	65	14.8
Hodgkin Lymphoma	20	2.7	9	2.4	11	2.9
Non-Hodgkin' Lymphoma	137	17.1	83	22.9	54	11.9
Myeloma	34	4.2	15	4.1	19	4.4
Leukemia	69	8.7	47	12.9	22	4.9
Acute Lymphocytic	9	1.2	6	1.6	3	0.8
Chronic Lymphocytic	12	1.5	9	2.5	3	0.5
Other Lymphocytic	1	0.1	1	0.3	0	0.0
Acute Myeloid	25	3.2	17	4.7	8	1.8
Chronic Myeloid	11	1.4	8	2.2	3	0.7
Acute Monocytic	3	0.3	0	0.0	3	0.6
Other Acute	5	0.6	4	1.1	1	0.3
Aleukemic, Subleukemic and NOS	3	0.4	2	0.6	1	0.3
Hematopoietic & Reticuloendothelial System	2	0.3	2	0.6	0	0.0
Peripheral Nerves, Autonomic Nervous System	1	0.1	0	0.0	1	0.2
Ill-Defined and Unspecified Sites	141	17.2	77	21.6	64	13.7

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: South Dakota Department of Health

Figure 1: Percentage distribution of new cancer cases, South Dakota, 2000



Source: South Dakota Department of Health

Of the 3,003 invasive and bladder *in situ* cases reported, breast cancer was the largest number, followed by prostate, colorectal, lung and bronchus, bladder and non-Hodgkin lymphoma. The top four cancers account for 57 percent of new cases in 2000. The SDCR will be working to reduce the percentage of ill-defined and unspecified sites.

In addition to the new 3,003 invasive cancers and *in situ* bladders (which are used to calculate incidence) there were an additional 127 *in situ* cancers from all other sites. They are included in the selected site section and also in all staging tables and pie charts, where applicable.

Thirty eight percent of all cancers reported to the SDCR in 2000 were at late stages, regional or distant. Sixteen percent of the reports did not have any staging information. The SDCR will work to reduce the high percentage of unknown stages. This is the first time that the SDCR is presenting summary stage, which is a requirement of the National Program of Cancer Registries' standard. In the past the American Joint Committee on Cancer (AJCC) staging system, *Tumor, Node, Metastasis (TNM)*, was required by the Cancer Data Collection System.

On the following pages, Table 5 displays all new cancer cases (invasive and *in situ*) by stage at diagnosis for selected sites by gender. Table 6 illustrates all new invasive and bladder *in situ* cases by the primary sites by race and gender. Table 7 further illustrates the same cases by age-adjusted rates by race.

Table 5: Stage at diagnosis for selected sites by gender, South Dakota, 2000
(All invasive and all *in situ*)

	Total			<i>In Situ</i>			Localized			Regional			Distant			Unknown		
Selected Primary Sites	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All Sites	3,130	1,545	1,585	201	92	109	1,224	627	597	628	273	355	570	311	259	507	242	265
Bladder	139	115	24	74	61	13	45	39	6	7	7	0	2	2	0	11	6	5
Brain	41	21	20	0	0	0	31	16	15	0	0	0	0	0	0	10	5	5
Breast, Female	584	0	584	68	0	68	278	0	278	144	0	144	24	0	24	70	0	70
Breast, Male	5	5	0	1	1	0	2	2	0	1	1	0	0	0	0	1	1	0
Cervix Uteri	26	0	26	0	0	0	19	0	19	5	0	5	1	0	1	1	0	1
Colon	312	144	168	9	5	4	110	56	54	102	42	60	43	24	19	48	17	31
Corpus and Uterus, NOS	92	0	92	4	0	4	65	0	65	6	0	6	14	0	14	3	0	3
Esophagus	34	31	3	0	0	0	8	6	2	4	4	0	9	9	0	13	12	1
Hodgkin Lymphoma	20	9	11	0	0	0	3	2	1	8	2	6	6	3	3	3	2	1
Kidney & Renal Pelvis	83	43	40	2	0	2	49	22	27	13	9	4	19	12	7	0	0	0
Larynx	32	28	4	2	2	0	19	17	2	6	4	2	4	4	0	1	1	0
Liver	13	7	6	0	0	0	1	1	0	2	1	1	2	1	1	8	4	4
Lung and Bronchus	378	215	163	0	0	0	66	30	36	103	62	41	169	98	71	40	25	15
Melanoma of the Skin	84	47	37	17	10	7	31	18	13	7	5	2	4	1	3	25	13	12
Myeloma	34	15	19	0	0	0	1	1	0	0	0	0	33	14	19	0	0	0
Non-Hodgkin Lymphoma	137	83	54	0	0	0	26	12	14	27	17	10	56	36	20	28	18	10
Oral Cavity & Pharynx	70	51	19	3	2	1	37	30	7	21	16	5	1	0	1	8	3	5
Ovary	45	0	45	0	0	0	5	0	5	9	0	9	25	0	25	6	0	6
Pancreas	53	30	23	0	0	0	4	3	1	11	7	4	31	16	15	7	4	3
Prostate	420	420	0	2	2	0	313	313	0	48	48	0	20	20	0	37	37	0
Rectum & Rectosigmoid	111	57	54	10	5	5	34	19	15	49	24	25	9	5	4	9	4	5
Stomach	39	26	13	0	0	0	7	4	3	14	9	5	9	7	2	9	6	3
Testis	10	10	0	0	0	0	7	7	0	2	2	0	1	1	0	0	0	0
Thyroid	40	12	28	0	0	0	23	6	17	11	5	6	0	0	0	6	1	5
All Other Sites	328	176	152	9	4	5	40	23	17	28	8	20	88	58	30	163	83	80

Source: South Dakota Department of Health

Table 6: Cancer cases by selected primary sites, race and gender, South Dakota, 2000
(All Invasive and Bladder *In Situ*)

PRIMARY SITE	All			White			American Indian			Other		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total Incidences	3,003	1,514	1,489	2,604	1,330	1,274	123	56	67	276	128	148
Bladder	139	115	24	127	106	21	2	2	0	10	7	3
Brain, Meninges, and CNS	42	21	21	39	19	20	2	2	0	1	0	1
Breast, Female	516	0	516	445	0	445	16	0	16	55	0	55
Cervix Uteri	26	0	26	22	0	22	4	0	4	0	0	0
Colon and Rectum	404	191	213	337	165	172	15	4	11	52	22	30
Esophagus	34	31	3	31	28	3	1	1	0	2	2	0
Corpus and Uterus, NOS	89	0	89	80	0	80	5	0	5	4	0	4
Hodgkin's Lymphoma	20	9	11	18	8	10	1	1	0	1	0	1
Kidney and Renal Pelvis	81	43	38	75	41	34	6	2	4	0	0	0
Leukemia	69	47	22	65	44	21	3	2	1	1	1	0
Liver and Intrahepatic Duct	16	10	6	9	7	2	4	2	2	3	1	2
Lung and Bronchus	378	215	163	341	197	144	21	8	13	16	10	6
Melanoma of the Skin	67	37	30	48	28	20	0	0	0	19	9	10
Myeloma	34	15	19	32	15	17	2	0	2	0	0	0
Non-Hodgkin Lymphoma	137	83	54	119	72	47	2	1	1	16	10	6
Oral Cavity and Pharynx	67	49	18	59	44	15	1	1	0	7	4	3
Ovary	45	0	45	43	0	43	0	0	0	2	0	2
Pancreas	53	30	23	50	28	22	3	2	1	0	0	0
Prostate	418	418	0	377	377	0	16	16	0	25	25	0
Stomach	39	26	13	32	20	12	3	3	0	4	3	1
Thyroid	40	12	28	32	10	22	1	1	0	7	1	6
All Others & Unspecified	289	162	127	223	121	102	15	8	7	51	33	18

Note: The 4 male breast cancer cases were moved to the "All Other & Unspecified" category.

Source: South Dakota Department of Health

Table 7: Age-adjusted cancer incidence rates by race, South Dakota, 2000
(All Invasive and Bladder *In Situ*)

PRIMARY SITE	All		White		American Indian		Other	
	Total	Age-Adjusted Rate	Total	Age-Adjusted Rate	Total	Age-Adjusted Rate	Total	Age-Adjusted Rate
Total Incidences	3,003	376.4	2,604	344.5	123	407.5	276	6178.9
Bladder	139	17.1	127	16.3	2	8.0	10	215.0
Brain, Meninges, and CNS	42	5.3	39	5.3	2	6.3	1	3.9
Breast, Female	516	125.0	445	115.6	16	88.2	55	2279.9
Cervix Uteri	26	6.9	22	6.5	4	19.2	0	0.0
Colon and Rectum	404	49.1	337	43.0	15	50.7	52	1283.5
Corpus and Uterus, NOS	89	21.9	80	20.6	5	21.8	4	145.7
Esophagus	34	4.3	31	4.1	1	3.1	2	47.1
Hodgkin's Disease	20	2.7	18	2.6	1	2.0	1	7.9
Kidney and Renal Pelvis	81	10.2	75	9.9	6	19.2	0	0.0
Leukemia	69	8.7	65	8.8	3	4.3	1	22.7
Liver and Intrahepatic Duct	16	2.0	9	1.1	4	13.6	3	55.4
Lung and Bronchus	378	47.0	341	44.4	21	74.9	16	379.2
Melanoma of the Skin	67	8.8	48	6.8	0	0.0	19	311.3
Myeloma	34	4.2	32	4.2	2	8.0	0	0.0
Non-Hodgkin Lymphoma	137	17.1	119	15.6	2	4.8	16	389.5
Oral Cavity and Pharynx	67	8.7	59	8.0	1	3.1	7	80.5
Ovary	45	10.6	43	10.9	0	0.0	2	74.9
Pancreas	53	6.6	50	6.5	3	8.1	0	0.0
Prostate	418	115.3	377	108.1	16	145.2	25	1543.2
Stomach	39	4.8	32	4.0	3	12.3	4	86.0
Thyroid	40	5.3	32	4.7	1	4.0	7	140.0
All Others & Unspecified	289	35.8	223	29.3	15	52.6	51	1178.0

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: South Dakota Department of Health

Summary of Cancer Mortality, South Dakota 2000

Cancer accounted for 22.9 percent of all deaths in South Dakota in 2000 and ranked as the second leading cause of death in South Dakota as well as nationally. One thousand, six hundred and four (1,604) South Dakotans died from cancer with 834 males and 770 females.

The South Dakota year 2000 age-adjusted mortality rate of 190.8 is not statistically significant from the SEER national rate of 199.6. County mortality age-adjusted rates in 2000 ranged from 77.0 in Faulk County to 487.9 in Haakon County as shown in Table 10. Although many counties appear to have high rates, only Haakon County's rate is significantly higher than the national rate.

Caution should be used when comparing rates among counties with low number of deaths. Counties with low rates that might appear to be statistically significant cannot be compared because of the low numbers of deaths and broad confidence interval ranges. Again it is better to look at rates for the longer periods, 1996-2000 to compare and interpret data.

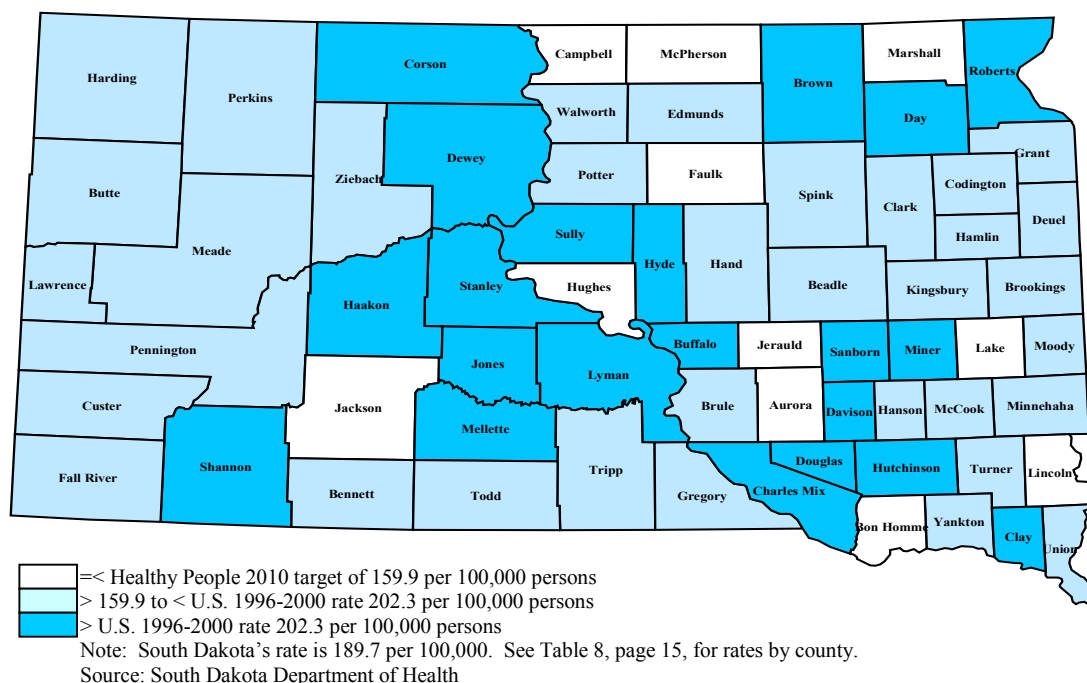
South Dakota's 5-year rate, 189.1 for the period 1996-2000, is significantly less than the U.S. rate of 202.2. Figure 2 shows age-adjusted mortality rates during the 5-year period 1996-2000 by county illustrating the counties that have attained the Healthy People 2010 goal of 159.9 deaths per 100,000 persons, those that are between the Healthy People 2010 goal and the 1996-2000 U.S. national rate of 202.2 and those still above the 1996-2000 U.S. rate. National rates were obtained from SEER Cancer Statistics Review 1975-2000. All rates are age-adjusted to the 2000 standard population and are per 100,000 persons.

**Table 8: Cancer deaths and age-adjusted rates by county,
South Dakota, 2000 and 1996-2000**

County	2000		1996-2000	
	Deaths	Rate	Deaths ¹	Rate ¹
South Dakota	1,604	190.8	7,896	189.1 ▼
Aurora	6	118.0	6	128.9 ▼
Beadle	50	203.9	48	202.0
Bennett	5	154.0	6	196.4
Bon Homme	22	181.4	16	138.2 ▼
Brookings	40	165.8	40	164.2 ▼
Brown	79	180.2	89	207.6
Brule	10	150.6	13	196.9
Buffalo	*	*	3	214.1
Butte	17	158.0	21	198.8
Campbell	4	128.4	4	157.3
Charles Mix	25	195.0	25	210.9
Clark	7	109.5 ▼	12	177.9
Clay	17	156.1	22	208.4
Codington	56	194.0	57	198.0
Corson	10	297.2	8	250.2
Custer	16	161.5	16	171.7
Davison	44	186.4	48	207.5
Day	24	224.5	23	214.9
Deuel	10	173.1	13	189.9
Dewey	15	368.8	10	236.9
Douglas	15	229.4	13	218.4
Edmunds	10	135.6	12	183.0
Fall River	22	166.1	24	187.9
Faulk	4	77.0 ▼	7	145.7 ▼
Grant	23	214.9	19	172.7
Gregory	23	240.1	16	194.5
Haakon	17	487.9 ▲	8	248.8
Hamlin	11	160.4	13	162.1
Hand	14	207.7	11	171.7
Hanson	5	150.1	6	180.0
Harding	*	*	3	181.2
Hughes	33	184.8	28	155.5 ▼
Hutchinson	25	139.4 ▼	32	218.2
Hyde	6	205.2	7	235.5
Jackson	*	104.3	4	150.1
Jerauld	9	222.2	7	154.1
Jones	4	254.9	5	291.3
Kingsbury	28	256.7	20	188.3
Lake	30	209.4	23	158.6 ▼
Lawrence	37	149.6 ▼	46	187.3
Lincoln	40	190.9	34	159.8 ▼
Lyman	8	194.7	9	213.8
McCook	9	107.2 ▼	17	187.5
McPherson	10	154.3	9	132.9 ▼
Marshall	9	117.9 ▼	10	134.1 ▼
Meade	42	202.0	36	178.0
Mellette	6	288.8	5	264.9
Miner	9	177.4	10	206.9
Minnehaha	265	200.4	258	195.7
Moody	15	176.3	13	168.1
Pennington	158	191.0	159	191.0
Perkins	12	195.1	9	169.0
Potter	8	152.8	8	166.2
Roberts	32	242.5	27	214.4
Sanborn	8	219.9	8	222.1
Shannon	15	268.2	16	282.5 ▲
Spink	15	150.8	18	174.9
Stanley	8	308.0	6	240.5
Sully	6	288.0	4	216.1
Todd	8	197.7	9	197.2
Tripp	20	221.2	17	187.6
Turner	29	192.4	28	201.7
Union	32	240.3	24	176.0
Walworth	16	184.4	16	172.8
Yankton	42	168.3	42	174.1 ▼
Ziebach	*	129.0	3	192.9

▲ Rate is significantly higher than the national rate ▼ Rate is significantly lower than the national rate
Data less than 3 per cell are suppressed. Source: South Dakota Department of Health;

Figure 2: Age-adjusted cancer mortality rates by counties, South Dakota 1996-2000



American Indians, who make up approximately 9 percent of the South Dakota population (2000 U.S. Census), have higher cancer mortality rates than the total and white South Dakota rates, and all the national race and ethnicity rates. Male rates

were higher in all races except for the Asian and Pacific Islanders' male rate, in which case South Dakota's female rate was 4 times the male rate. The Asian population in South Dakota is less than 1 percent.

Table 9: Cancer mortality age-adjusted rates by race and ethnicity, South Dakota and U.S., 2000

Race	South Dakota ⁺			U.S. SEER Rate*		
	Total	Males	Females	Total	Males	Females
All Races	190.8	235.4	160.9	199.6	249.8	167.3
White	189.2	233.1	160.1	199.1	249.5	166.9
Black	34.2	46.5	0.0	249.6	343.3	194.3
American Indian/Alaskan Native	246.3▲	304.7▲	207.2▲	129.3	158.1	109.4
Asian/Pacific	165.7▲	56.3▲	238.8▲	122.4	151.8	101.0
Hispanic	107.9	131.9	75.0	136.4	174.6	111.7

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

▲ State rate is significantly higher than the national rate

▼ State rate is significantly lower than the national rate

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

Table 10: Cancer mortality age-adjusted rates by race and ethnicity, South Dakota and U.S., 1996-2000

Race	South Dakota ⁺			U.S. SEER Rate*		
	Total	Males	Females	Total	Males	Females
All Races	189.1	237.6	155.5	202.3	255.5	168.3
White	188.3	237.1	154.4	199.1	249.5	166.9
Black	67.3	102.7	4.0	257.1	356.2	198.6
American Indian/Alaskan Native	222.9▲	272.9▲	190.8▲	138.0	172.3	115.8
Asian/Pacific	128.1	103.3▼	149.5▲	124.5	154.8	102.0
Hispanic	65.5	87.1	48.2	137.0	176.2	111.5

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population

▲ state rate is significantly higher than the national rate ▼ state rate is significantly lower than the national rate

Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

Figure 3: Percentage distribution of cancer deaths, South Dakota, 2000

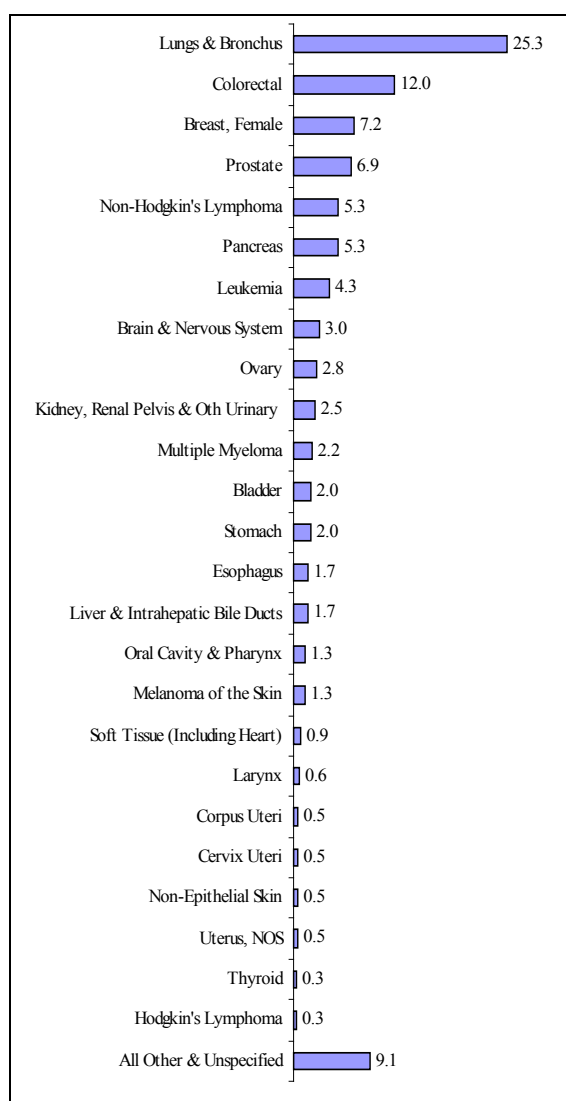


Figure 3 shows that lung and bronchial cancers accounted for one quarter of all cancer deaths and 6 percent of all deaths.

The top six cancers were lung and bronchus, colon and rectum, breast, prostate, non-Hodgkin lymphoma and pancreas and accounted for 62 percent of cancer deaths and 13 percent of all deaths in South Dakota in 2000.

Table 11 shows that among women, lung and bronchial cancers are the leading cause of death, followed by breast cancer colorectal, non-Hodgkin, ovarian and pancreatic cancers. Among males, lung and bronchial cancers were the leading cause of cancer deaths, followed by prostate, colorectal, non-Hodgkin lymphoma, and pancreatic cancers

Apart from the gender specific cancers such as prostate and breast, Table 12 illustrates that once again more males died from cancer than females. The age-adjusted mortality rate for males was 235.4 per 100,000 compared to 160.9 per 100,000 females. Table 12 also presents the number of deaths by race.

Table 13 shows age-adjusted rates by selected sites and race.

Table 11 : Cancer mortality by site and gender, South Dakota, 2000

PRIMARY SITE	Total		Males		Females	
	Deaths	Age Adjusted Rate	Deaths	Age Adjusted Rate	Deaths	Age Adjusted Rate
Total	1604	190.8	834	235.4	770	160.9
Oral Cavity & Pharynx	23	2.8	11	3.1	12	2.8
Lip	1	0.1	1	0.3	0	0.0
Tongue	4	0.5	2	0.6	2	0.4
Salivary Gland	4	0.5	2	0.5	2	0.5
Floor of Mouth	1	0.1	1	0.3	0	0.0
Gum and Other Mouth	5	0.6	2	0.6	3	0.6
Nasopharynx	2	0.3	0	0.0	2	0.6
Hypopharynx	2	0.2	1	0.3	1	0.3
Tonsil	0	0.0	0	0.0	0	0.0
Oropharynx	0	0.0	0	0.0	0	0.0
Other Oral Cavity & Pharynx	4.0	0.5	2	0.5	2	0.5
Digestive System	271	32.1	136	38.9	135	27.2
Esophagus	29	3.7	24	6.6	5	1.1
Stomach	29	3.4	16	4.6	13	2.6
Small Intestine	5	0.6	3	0.8	2	0.4
Colon Excluding Rectum	175	20.5	71	20.5	104	20.9
Rectum and Rectosigmoid	32	3.7	21	6.1	11	2.2
Anus, Anal Canal and Anorectum	1	0.1	1	0.3	0	0.0
Liver and Intrahepatic Bile Duct	128	15.3	64	17.9	64	13.1
Liver	16	1.9	11	3.1	5	0.9
Intrahepatic Bile Duct	8	1.0	4	1.1	4	1.1
Gallbladder	8	0.9	1	0.3	7	1.3
Other Biliary	8	0.9	3	0.9	5	0.9
Pancreas	82	9.8	42	11.6	40	8.0
Retroperitoneum	1	0.1	1	0.3	0	0.0
Peritoneum, Omentum and Mesentery	2	0.3	0	0.0	2	0.6
Other Digestive Organs	3	0.4	2	0.5	1	0.3
Respiratory System	404	48.8	253	70.5	151	32.8
Nose, Nasal Cavity and Middle Ear	0	0.0	0	0.0	0	0.0
Larynx	8	0.9	4	1.1	4	0.8
Lung and Bronchus	396	47.9	249	69.4	147	31.9
Pleura	0	0.0	0	0.0	0	0.0
Trachea, Other Respiratory	0	0.0	0	0.0	0	0.0
Bones and Joints	5	0.6	3	0.9	2	0.4
Soft Tissue (Including Heart)	14	1.7	9	2.6	5	0.9
Skin (Excluding Basal and Squamous)	27	3.2	16	4.5	11	2.4
Melanoma of the Skin	16	2.0	9	2.6	7	1.7
Other Nonepithelial	11	1.2	7	2.0	4	0.7
Breast	130	28.1	1	0.3	129	27.9

Table 11: Cancer mortality by site and gender, South Dakota, 2000 (Continued)

PRIMARY SITE	Total		Males		Females	
	Deaths	Age Adjusted Rate	Deaths	Age Adjusted Rate	Deaths	Age Adjusted Rate
Female Genital System	70	14.9			70	14.9
Cervix Uteri	10	2.3			10	2.3
Corpus Uteri	7	1.5			7	1.5
Uterus, NOS	8	1.7			8	1.7
Ovary	42	8.7			42	8.7
Vagina	1	0.2			1	0.2
Vulva	1	0.2			1	0.2
Other Female Genital Organs	1	0.3			1	0.3
Male Genital System	101	29.3	101	29.3		
Prostate	101	29.3	101	29.3		
Urinary System	62	7.2	40	11.4	22	4.2
Bladder	25	2.8	19	5.6	6	1.2
Kidney and Renal Pelvis	36	4.3	20	5.5	16	3.0
Ureter	1	0.1	1	0.3	0	0.0
Eye and Orbit	2	0.2	1	0.3	1	0.2
Brain and Other Nervous System	47	5.9	22	6.2	25	5.7
Brain	45	5.7	22	6.2	23	5.3
Meninges, Cranial Nerves, Other Central Nervous Sys	2	0.2	0	0.0	2	0.4
Endocrine System	6	0.8	4	1.1	2	0.4
Thyroid	5	0.6	3	0.8	2	0.4
Adrenal Gland	1	0.1	1	0.3	0	0.0
Other Endocrine Glands (Including Thymus)	0	0.0	0	0.0	0	0.0
Lymphomas	103	12.3	55	15.2	48	9.7
Hodgkin Lymphoma	9	1.2	4	1.1	5	1.2
Non-Hodgkin Lymphomas	94	11.1	51	14.2	43	8.5
Myeloma	41	4.7	21	6.0	20	3.9
Leukemias - Lymphocytic	17	1.9	12	3.5	5	0.7
Acute Lymphocytic Leukemia	4	0.5	4	1.1	0	0.0
Chronic Lymphocytic Leukemia	13	1.4	8	2.4	5	0.7
Leukemias - Myeloid	34	4.2	19	5.2	15	3.3
Acute Myeloid Leukemia	22	2.7	11	3.1	11	2.5
Chronic Myeloid Leukemia	8	1.0	5	1.4	3	0.6
Other Myeloid Leukemia	4	0.5	3	0.8	1	0.2
Leukemias - Monocytic	2	0.2	0	0.0	2	0.3
Acute Monocytic Leukemia	1	0.1	0	0.0	1	0.2
Other Monocytic Leukemia	1	0.1	0	0.0	1	0.1
Leukemias - Other	13	1.4	7	2.0	6	1.1
Other Acute Leukemia	7	0.8	4	1.2	3	0.5
Other Chronic Leukemia	2	0.2	0	0.0	2	0.4
Aleukemic, Subleukemic, and NOS	4	0.4	3	0.9	1	0.2
Ill-Defined and Unspecified Sites	104	12.2	59	16.5	45	8.9

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: South Dakota Department of Health

Table 12: Cancer deaths by selected primary site, race and gender, South Dakota, 2000

Primary Site	ALL			White			American Indian			Other		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total Deaths	1,604	834	770	1,530	795	735	69	37	32	5	2	3
Bladder	25	19	6	25	19	6	0	0	0	0	0	0
Brain, Meninges and CNS	47	22	25	45	21	24	2	1	1	0	0	0
Breast, Female	129	0	129	127	0	127	2	0	2	0	0	0
Cervix Uterine	10	0	10	8	0	8	2	0	2	0	0	0
Colon and Rectum	207	92	115	201	88	113	6	4	2	0	0	0
Corpus and Uterus, NOS	15	0	15	13	0	13	2	0	2	0	0	0
Esophagus	29	24	5	28	24	4	1	0	1	0	0	0
Hodgkin Lymphoma	9	4	5	8	3	5	1	1	0	0	0	0
Kidney and Renal Pelvis	36	20	16	35	19	16	1	1	0	0	0	0
Leukemia	66	38	28	66	38	28	0	0	0	0	0	0
Liver and Intrahepatic Duct	24	15	9	21	12	9	3	3	0	0	0	0
Lung and Bronchus	396	249	147	369	234	135	25	15	10	2	0	2
Melanoma of the Skin	27	16	11	27	16	11	0	0	0	0	0	0
Myeloma	41	21	20	40	20	20	1	1	0	0	0	0
Non-Hodgkin Lymphoma	94	51	43	93	51	42	0	0	0	1	0	1
Oral Cavity and Pharynx	23	11	12	21	10	11	2	1	1	0	0	0
Ovary	42	0	42	40	0	40	2	0	2	0	0	0
Pancreas	82	42	40	77	38	39	4	3	1	1	1	0
Prostate	101	101	0	99	99	0	2	2	0	0	0	0
Stomach	29	16	13	25	13	12	4	3	1	0	0	0
Thyroid	5	3	2	3	2	1	1	0	1	1	1	0
All Other & Unspecified	167	90	77	159	88	71	8	2	6	0	0	0

Source: South Dakota Department of Health

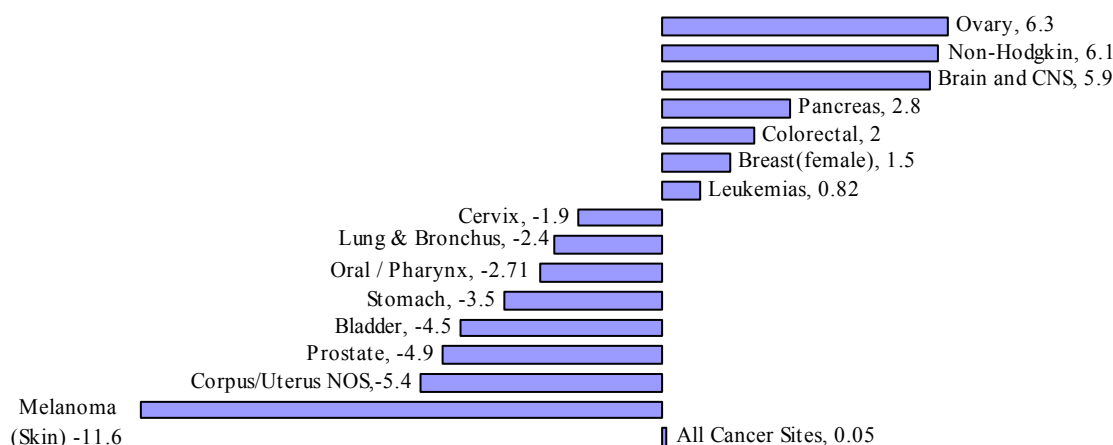
Table 13: Age-adjusted mortality rates by selected primary site and race, South Dakota, 2000

Primary Site	ALL		White		American Indian		Other	
	Total	Age-Adjusted Rate	Total	Age-Adjusted Rate	Total	Age-Adjusted Rate	Total	Age-Adjusted Rate
Total Deaths	1,604	190.8	1,530	189.2	69	246.3	5	80.6
Bladder	25	2.8	25	2.9	0	0	0	0
Brain, Meninges and CNS	47	5.9	45	6.0	2	4.1	0	0.0
Breast, Female	129	27.9	127	28.9	2	13.8	0	0.0
Cervix Uteri	10	2.3	8	1.9	2	12.1	0	0.0
Colon and Rectum	207	24.3	201	24.5	6	22.5	0	0.0
Corpus and Uterus, NOS	15	3.3	13	3.0	2	13.1	0	0.0
Esophagus	29	3.7	28	3.7	1	2.8	0	0.0
Hodgkin Lymphoma	9	1.2	8	1.1	1	4.0	0	0.0
Kidney and Renal Pelvis	36	4.3	35	4.3	1	2.0	0	0.0
Leukemia	66	7.7	66	8.1	0	0.0	0	0.0
Liver and Intrahepatic Duct	24	3.0	21	2.7	3	7.3	0	0.0
Lung and Bronchus	396	47.9	369	46.3	25	90.7	2	41.6
Melanoma of the Skin	27	3.2	27	3.4	0	0.0	0	0.0
Myeloma	41	4.7	40	4.8	1	2.3	0	0.0
Non-Hodgkin Lymphoma	94	11.1	93	11.5	0	0.0	1	18.9
Oral Cavity and Pharynx	23	2.8	21	2.7	2	6.5	0	0.0
Ovary	42	8.7	40	8.7	2	16.5	0	0.0
Pancreas	82	9.8	77	9.5	4	15.4	1	10.0
Prostate	101	29.3	99	29.5	2	26.8	0	0.0
Stomach	29	3.4	25	3.0	4	12.1	0	0.0
Thyroid	5	0.6	3	0.4	1	3.1	1	10.0
All Other & Unspecified	167	19.7	159	19.5	8	31.1	0	0.0

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: South Dakota Department of Health

Figure 4: Trends in percentages in the five-year rate changes in mortality for selected cancer sites, South Dakota, 1996-2000



Source: SEER Cancer Statistics Review 1996-2000

TRENDS IN MORTALITY FOR SELECTED SITES

Trends in the 5-year annual percentage (APC) show cancer trends for selected sites. Individual rates that are rising are the leukemias, breast, colorectal, pancreas, brain and central nervous system, non-Hodgkin lymphomas and ovarian cancer. Rates for melanoma of the skin, corpus uteri, prostate, bladder, stomach, oral cavity and pharynx, lung and bronchus and cervical cancers are declining. Figure 4 was prepared using SEER STAT.

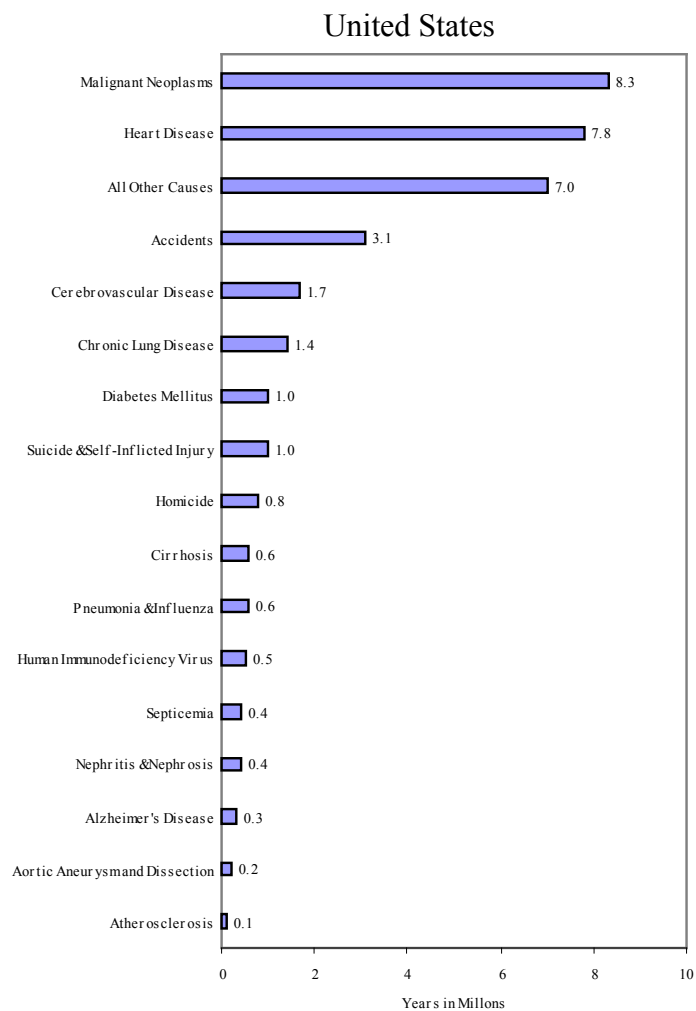
PERSON-YEARS OF LIFE LOST

Mortality rates give an incomplete picture of the cancer burden. The person-years of life lost (PYLL) due to premature death add a different dimension. Malignant neoplasms led the PYLL (8.3 million years) due to premature death in the United States in 2000. Of these years lost, 4,049 years can be attributed to cancer in South Dakota as displayed in Figure 5. Although cancer was the second leading cause of death in South

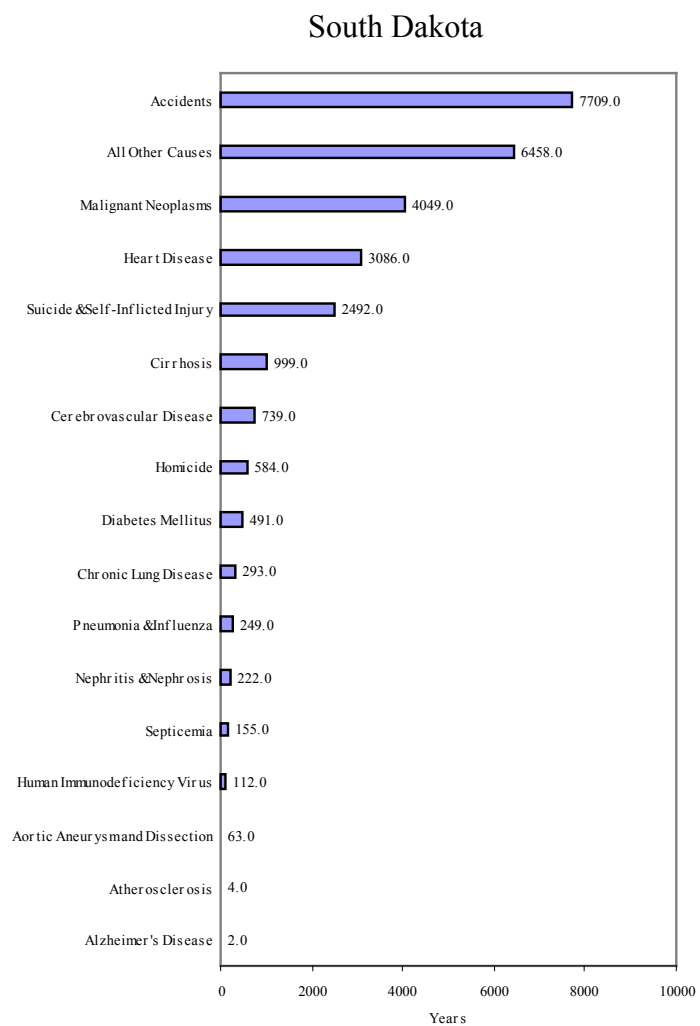
Dakota, it ranked third in PYLL. Figure 6 shows PYLL due to cancer for the U.S. and South Dakota. For both the U.S. and South Dakota, the top three types of cancers that contribute to the most years of life lost are lung and bronchus, female breast and colorectal cancers. Childhood cancers ranked seventh in South Dakota and eighteenth nationally. Figure 7 shows the distribution of PYLL due to cancer by race in South Dakota.

AVERAGE YEARS OF LIFE LOST

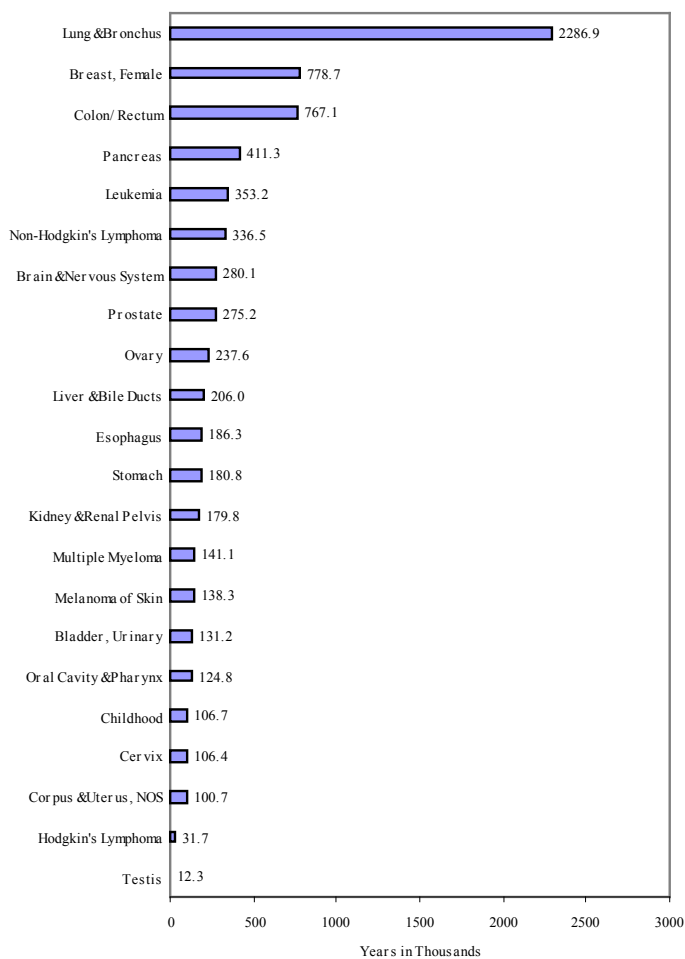
For Average Years of Life Lost (AYLL), malignant neoplasms ranked seventh in South Dakota and twelfth nationally for all deaths, as shown in Figure 8. For deaths due to cancer, childhood cancers ranked first for AYLL in both South Dakota and nationally as expected because more years of life are lost if one dies young, Figure 9. Childhood cancer led the AYLL for whites and kidney and renal pelvis led for American Indians in 2000 for South Dakota, as illustrated in Figure 10.

Figure 5: Person-years of life lost due to major causes of death, U.S. and South Dakota, 2000

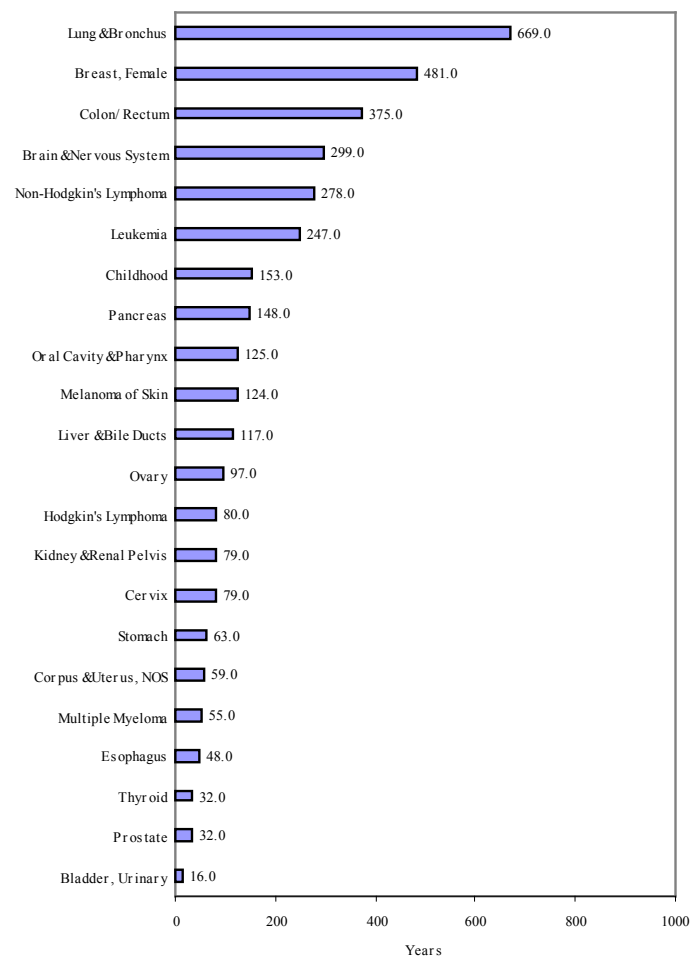
Source: SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

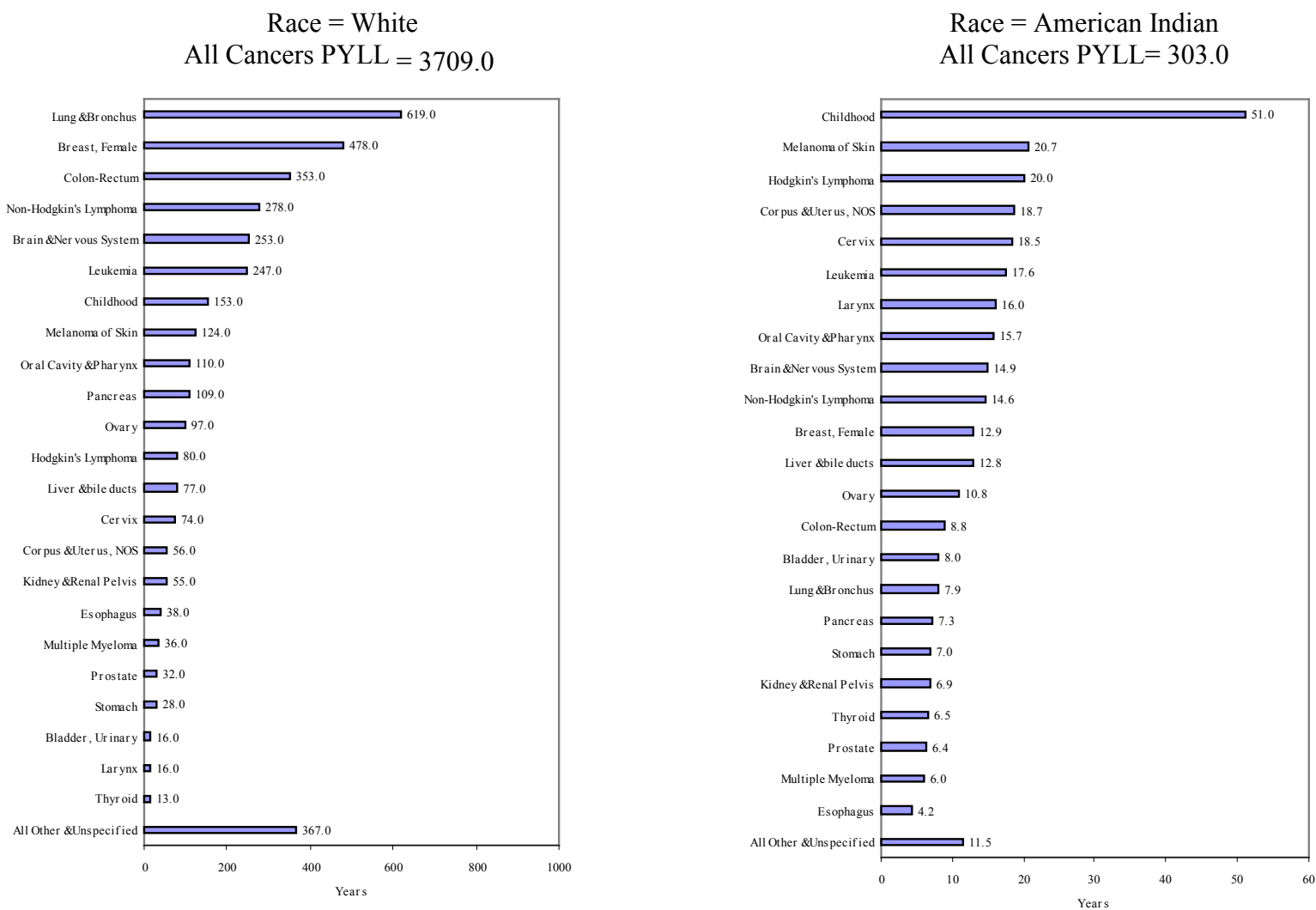
Figure 6: Person-years of life lost due to cancer, U.S. and South Dakota, 2000

Source: SEER Cancer Statistics Review 1975-2000

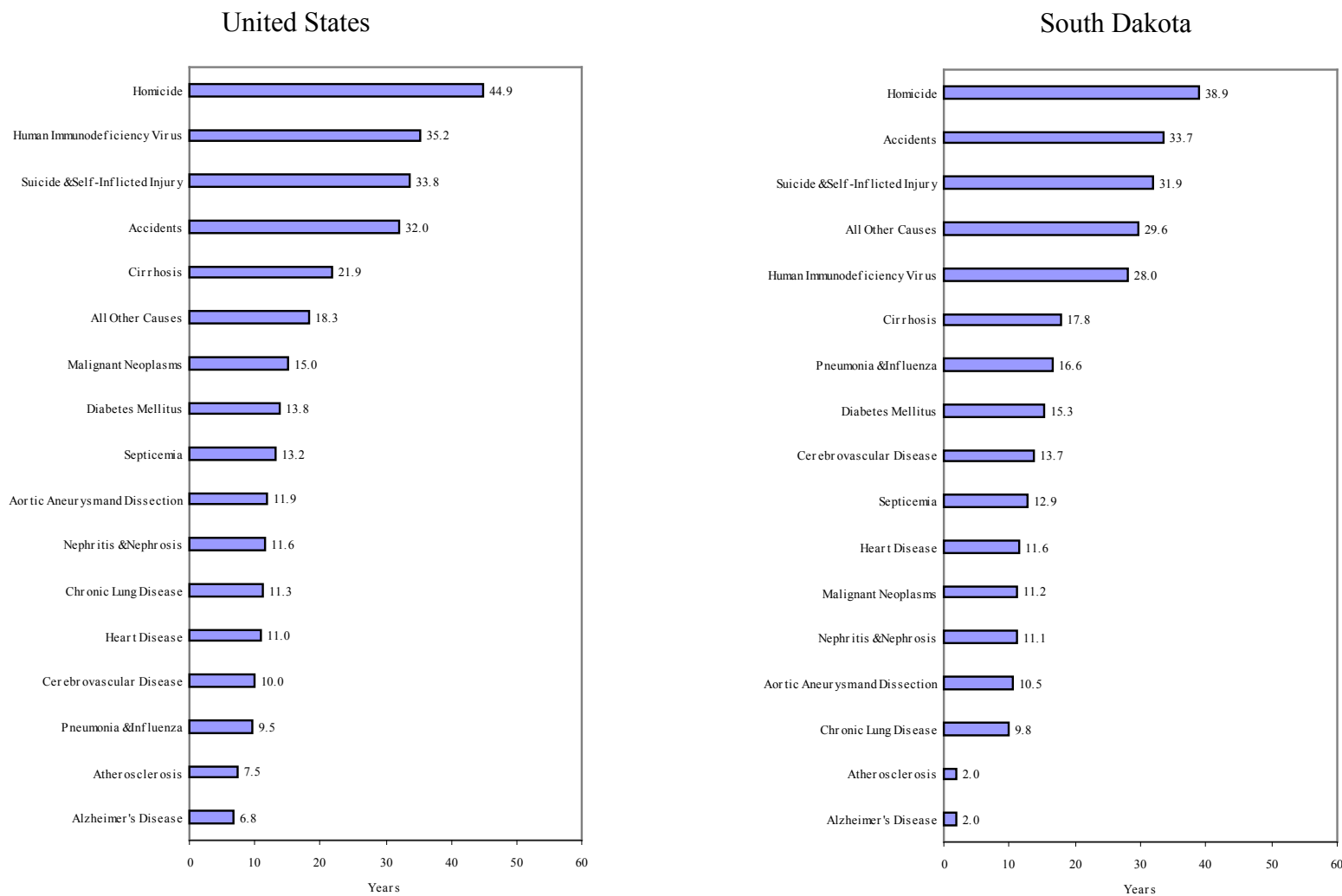


Source: South Dakota Department of Health

Figure 7: Person-years of life lost due to cancer by race, U.S. and South Dakota, 2000

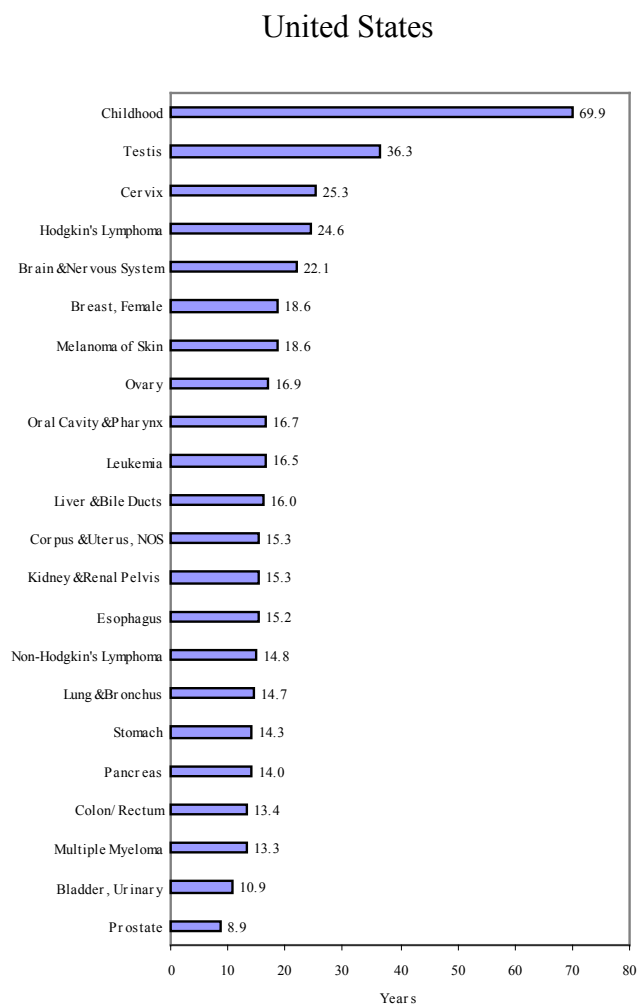
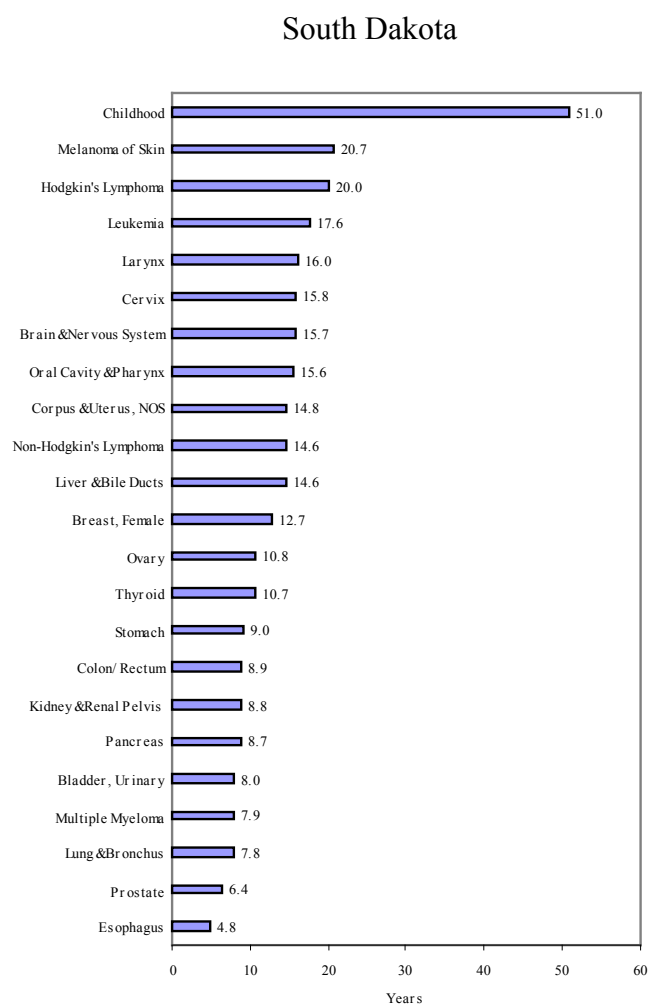


Source: South Dakota Department of Health

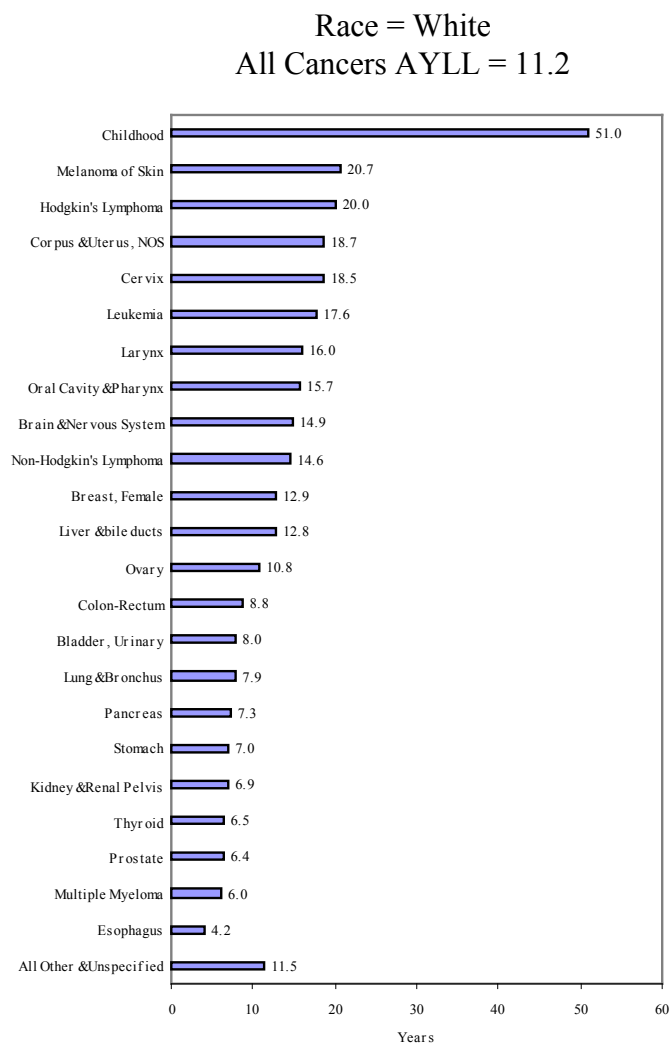
Figure 8: Average years of life lost per person due to major causes of death, U.S. and South Dakota, 2000

Source: SEER Cancer Statistics Review 1975-2000

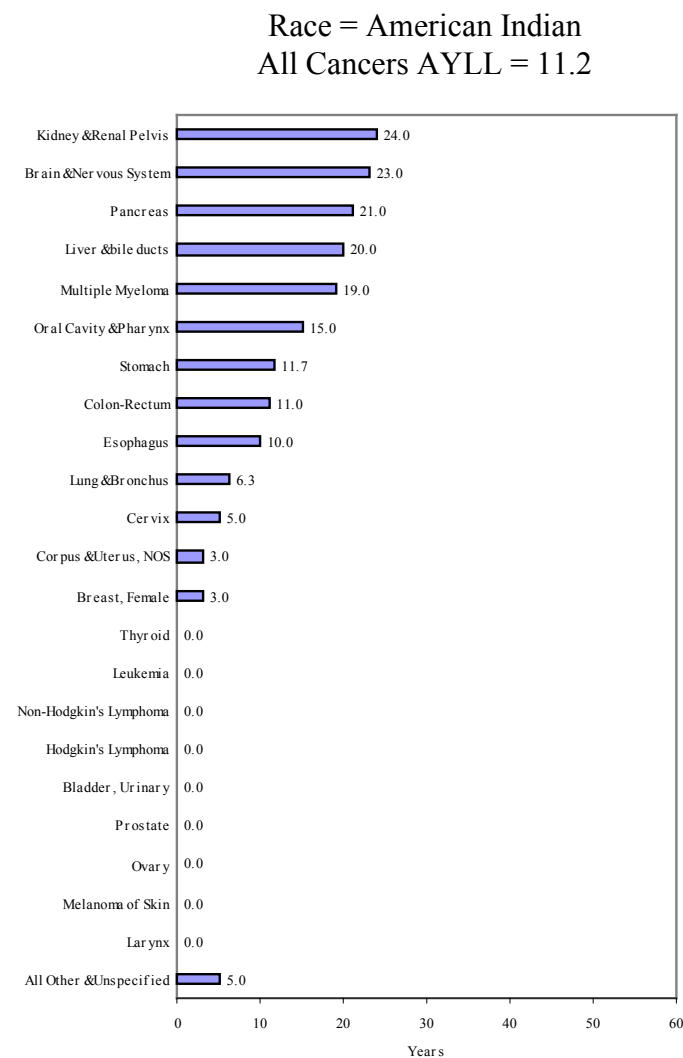
Source: South Dakota Department of Health

Figure 9: Average years of life lost per person due to cancer, U.S. and South Dakota, 2000Source: *SEER Cancer Statistics Review 1975-2000*

Source: South Dakota Department of Health

Figure 10: Average years of life lost per person due to cancer by race, South Dakota, 2000

Source: South Dakota Department of Health



Source: South Dakota Department of Health

ECONOMIC BURDEN OF CANCER⁴

The burden of cancer is tremendous not only in the 4,049 years of life lost, but also in the cost of cancer, estimated at approximately \$494 million for South Dakota. Many cancers are preventable. See Figure 38 for causes of cancer in which the graph clearly shows that many of the risk factors are preventable.

Associated costs are as follows:

- The economic burden to the individual cancer patient, family and society resulting from cancer and cancer treatment.
- Economic factors at the individual, community and health system level that effect access to and outcomes

following the use of cancer-related prevention, screening, diagnostic and treatment services.

- The cost and organizational structure of delivering cancer prevention, screening and treatment services.
- Cost-utility, cost-effectiveness or cost-benefit analysis.
- The economics of decision making processes.
- The role of economic factors and financial incentives in clinical trials.
- The identification, development and validation of data resources.
- Methodological studies.

The following table shows some of the costs associated with selected cancers.

Table 14: Estimates of national expenditures for medical treatment for the 13 most common cancers – based on cancer prevalence in 1996 and cancer-specific costs for 1995-1998 (estimates in 1996 dollars)

	Percent of all new cancers (1998)	Expenditures (in 1996 dollars)	Percent of all cancer treatment expenditures	Average Medicare payments per individual in first year following diagnosis
Breast	18.2	\$5.4 billion	13.1	\$9,230
Colorectal	11.7	\$5.4 billion	13.1	\$21,608
Lung	12.5	\$4.9 billion	12.1	\$20,340
Prostate	13.6	\$4.6 billion	11.3	\$8,869
Lymphoma	4.2	\$2.6 billion	6.3	\$17,217
Bladder	4.0	\$1.7 billion	4.2	\$10,770
Cervix	2.3	\$1.7 billion	4.1	\$13,083
Head/Neck	3.3	\$1.6 billion	4.0	\$14,788
Leukemia	2.1	\$1.2 billion	2.8	\$11,882
Ovary	1.7	\$1.5 billion	3.7	\$32,340
Melanoma	5.2	\$0.7 billion	1.7	\$3,177
Pancreas	2.1	\$0.6 billion	1.5	\$23,504
Esophagus	0.9	\$0.4 billion	0.9	\$25,886
All Other	18.1	\$8.7 billion	21.2	\$17,201
Total	100.0	\$41.0 billion	100.0	\$229,895

Data source: Brown ML, Riley GF, Schussler N, Etzioni R.

Estimating health care cost from SEER-Medicare data. Submitted to Medical Care.

⁴ *Cancer Progress Report 2001

(<http://progressreport.cancer.gov/>)

National Cancer Institute, National Institutes of Health,
U.S. Department of Health and Human Services

SECTION III

INCIDENCE AND MORTALITY

SUMMARIES FOR SELECTED SITES

This section presents summaries for the following: all sites, bladder, breast (female), cervix uteri, colorectal, corpus and uterus NOS, kidney and renal pelvis, leukemia, lung and bronchus, melanoma (skin), multiple myeloma, non-Hodgkin's lymphoma, oral cavity and pharynx, ovary, pancreas, prostate, stomach and thyroid cancers. *In situ* cases are presented to show how many cases are diagnosed at this stage. Risks and associated risk factors reflect national data and not necessarily risks and associated risk factors specific to South Dakota. No data on minority groups other than American Indians are presented for South Dakota in 2000 in this section because the minority populations are each one percent or less of the total 2000 South Dakota population (Appendix B).

All data for South Dakota came from the South Dakota Department of Health. National data came from *SEER Cancer Review 1975-2000*. Age-adjusted rates are adjusted to the U.S. 2000 Standard Population and these include all invasive cancers and *in situ* bladder cancers. Rates are per 100,000 persons based on the 2000 U.S. Standard population.

Incidence rates are based on 86 percent case completeness, therefore, actual rates would be higher with more cases reported. **This should be taken into account when using any incidence rates in this publication.**

All survival data represent national data obtained from SEER and the American Cancer Society.

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ALL CANCER SITES

South Dakota 2000

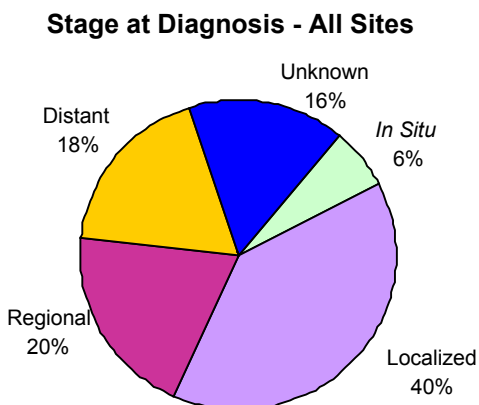
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	2929	1453	1476
No. of new <i>In situ</i> cases	201	92	109
South Dakota incidence rate ⁺	376.1	419.8	347.7
United States incidence rate*	472.9	560.2	413.8
Number of deaths	1604	834	770
South Dakota mortality rate ⁺	190.8	235.4	160.9
United States mortality rate*	199.6	249.8	167.3
Healthy People 2010 Obj.	159.9		

Rates are per 100,000 persons, age-adjusted

Source: + South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Cancer is the second leading cause of death in South Dakota. About one in four South Dakotans died of cancer in 2000. The likelihood of being diagnosed with cancer increases with age. Males have a higher incidence than females in most non-gender specific cancer types. One in two men and one in three women will develop cancer during their lifetime.

Mortality: South Dakota's age-adjusted mortality increased slightly, annual percent

change (APC) 0.5 percent over the five year period 1996-2000, but is lower than the national rate. South Dakota's mortality rate for American Indians is higher than the rate for whites and almost twice the national rate.

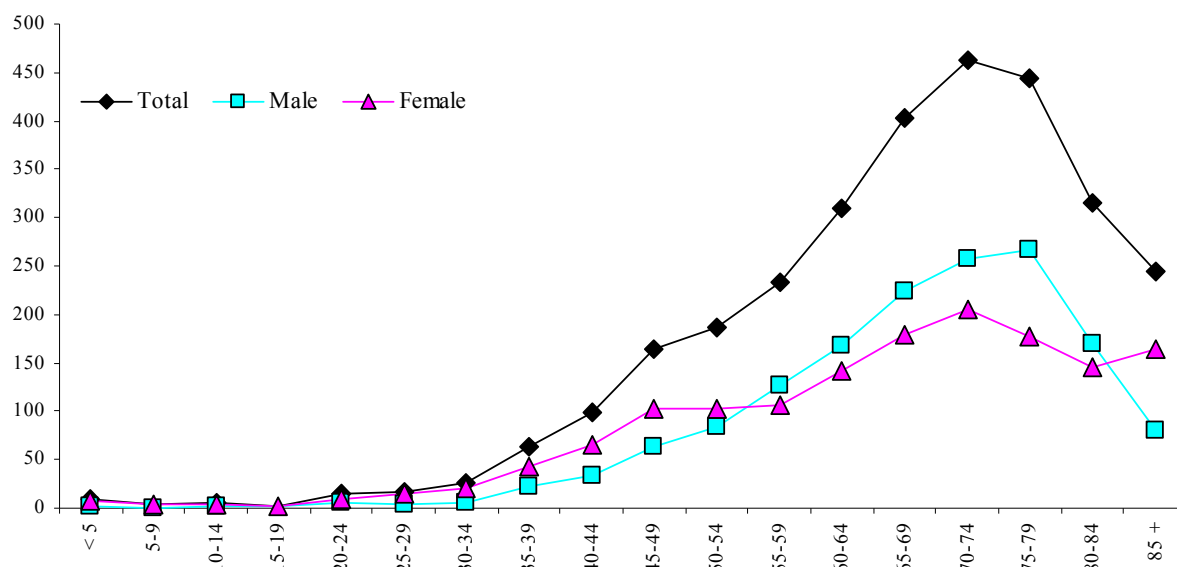
Risk and Associated Risk factors

Tobacco use is thought to cause 30 percent of all cancers. Thirty percent are due to diet and obesity in adults. Diets high in fruits and vegetable and low in fat and red meat reduce risks. Occupational risk, sedentary lifestyle, infectious agents, prenatal and growth factors contribute to risks. Other risk factors are reproductive, socio-economic, alcohol, prescription drugs, environmental pollution and ultraviolet radiation, and salt and other food contaminants.

Early Detection and Prevention

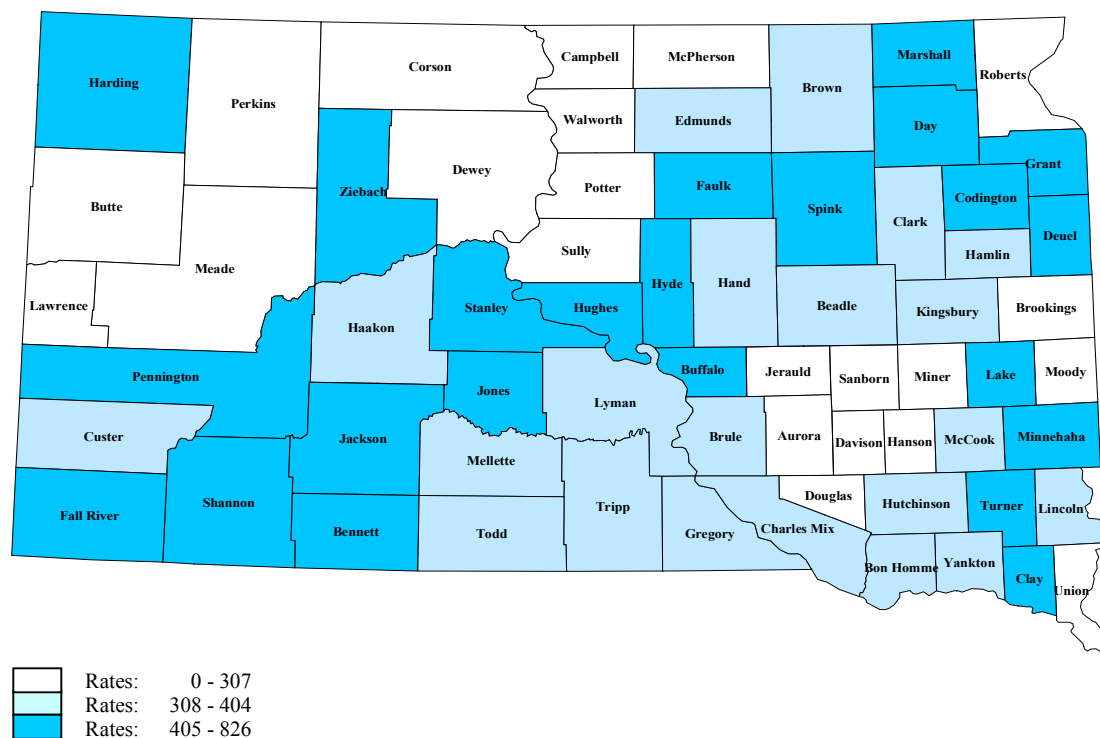
Cancers detected at an early stage are more likely to be cured but there are only a few types of cancers which have screening protocols that have been effective in reducing mortality among asymptomatic persons with average risks of developing the disease. Routine screening is recommended for female breast, cervix and colorectal cancers. The American Cancer Society (ACS) suggests that men age 50 and older should discuss prostate cancer with their doctors. Everyone should have a cancer related screening between ages 20-29 every three years, and annually after 40 years of age. Symptomatic persons should seek prompt care for an earlier diagnosis. Recommendations are available from the ACS website: <http://www.cancer.org> or the National Cancer Institute Cancer Information Service website at <http://cis.nci.nih.gov>.

Figure 11: New cancer cases by age and gender, South Dakota 2000



Source: South Dakota Department of Health

Figure 12: All sites age-adjusted incidence rates*, by county, South Dakota 2000
South Dakota's Incidence Rate: 376.4



Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

*Interpret with caution as the incidence rates represent 86 percent of expected cases. Rates could be higher with the national standard of 95 percent of expected cases.

Source: South Dakota Department of Health

The graph shows that the number of deaths increases significantly with age, particularly for males in the 70-74 age group and for females in the 85 and up age group. The total number of deaths peaks in the 85 and up age group.

Age Group	Total	Male	Female
<5	0	0	0
5-9	5	5	0
10-14	0	0	0
15-19	5	5	0
20-24	10	10	0
25-29	0	0	0
30-34	10	5	5
35-39	20	10	10
40-44	15	10	5
45-49	35	15	20
50-54	60	30	30
55-59	80	45	35
60-64	130	75	55
65-69	150	70	80
70-74	275	150	125
75-79	265	165	95
80-84	235	140	95
85 and up	315	125	190

Figure 14: All sites age-adjusted mortality rates by county, South Dakota 2000

South Dakota's Mortality Rate: 190.8

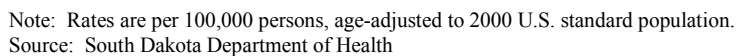
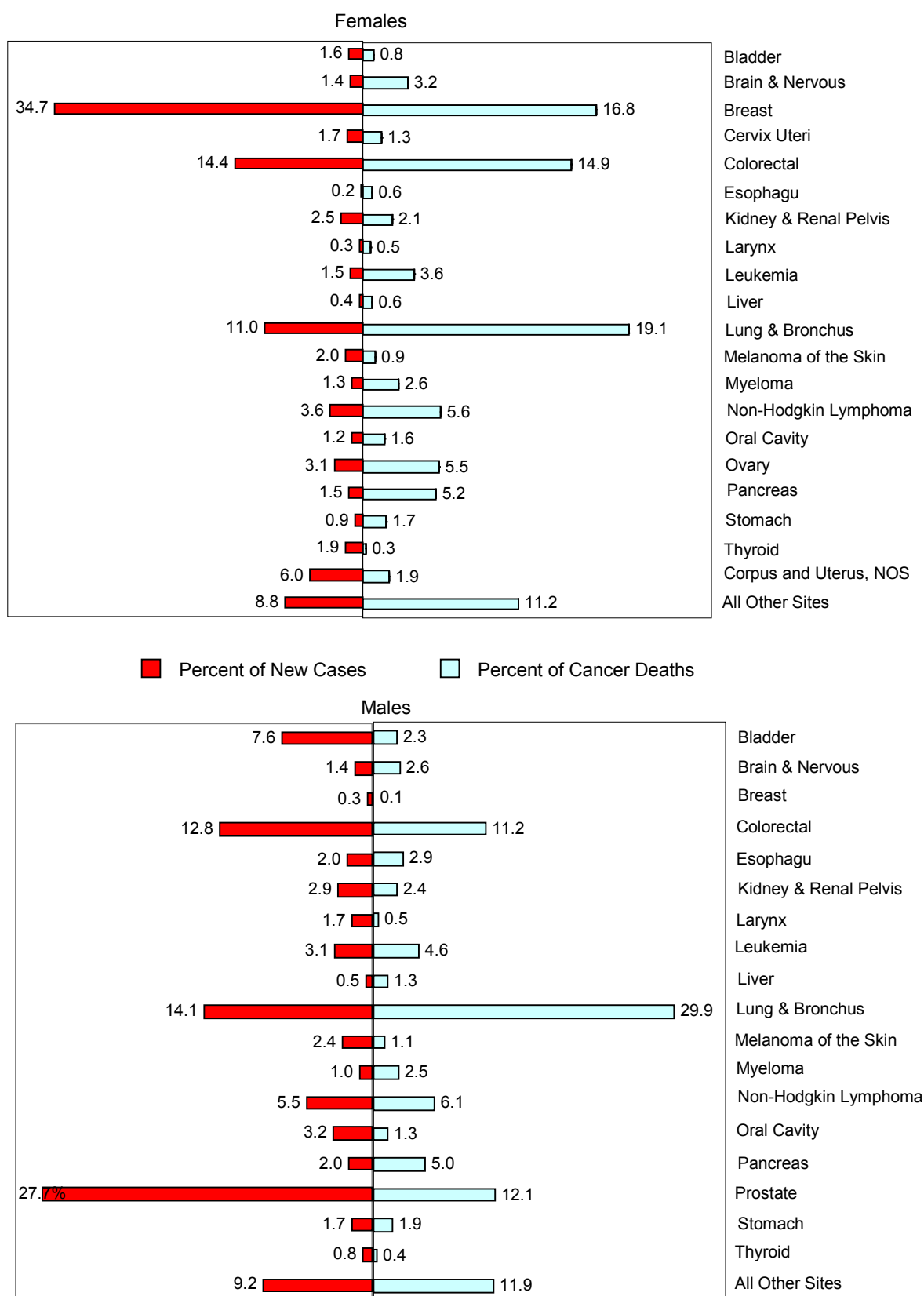


Figure 15: Percent distribution of cancer cases and deaths, by sex, South Dakota, 2000



Source: South Dakota Department of Health

BLADDER

South Dakota 2000

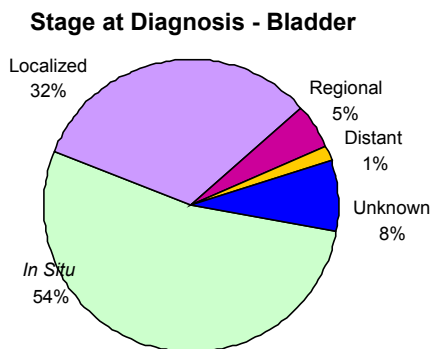
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	65	54	11
No. of new <i>in situ</i> cases	74	61	13
South Dakota incidence rate ⁺	17.1	32.0	5.3
United States incidence*	21.3	37.8	9.4
Number of deaths	25	19	6
South Dakota mortality rate ⁺	2.8	5.6	1.2
United States mortality rate*	4.3	7.6	2.3

Rates are per 100,000 persons, age-adjusted

Source: + South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Cancers of the urinary bladder were the fourth most frequent cancer with 4.6 percent of cancers reported. One hundred and thirty-nine cases were observed, including 74 carcinoma *in situ* (CIS) of the bladder⁵, which are included to calculate rates. The ACS estimated 100 cases for South Dakota in 2000. Most cases were diagnosed localized or *in situ*. Generally, the most frequent onset is during the middle sixties age group and men are affected three times as often as women.

⁵ CIS of the bladder is a highly malignant, aggressive neoplasm. It is a diffuse heterogeneous disease and prior to the use of the Bacillus-Calmette-Guerin (BCG) immunotherapy, 54 percent progressed to muscle invasive or metastasis within five years. Before medical advances leading to improved surgical procedures and immunotherapy, as high as 90 percent of CIS patients had tumor recurrence.

Rates increase sharply with age and 60 percent of cancers are diagnosed among those 64 to 84 years old.

Mortality: Bladder cancer was the thirteenth cause of cancer deaths and accounted for 2 percent of all deaths during 2000. Mortality among males is more than twice that of females. Bladder cancer deaths are at their lowest in five years. Overall mortality rates have gone down at an annual percent change (APC) of -4.5 percent over the five year period, 1996-2000. Figure 17 shows this decline in deaths and accompanying age-adjusted mortality rates. South Dakota's mortality rate is lower than the national rate. American Indians had 1.5 times the mortality rate of whites in South Dakota from 1996-2000 even though there were no American Indian deaths due to bladder cancer in 1999 and 2000.

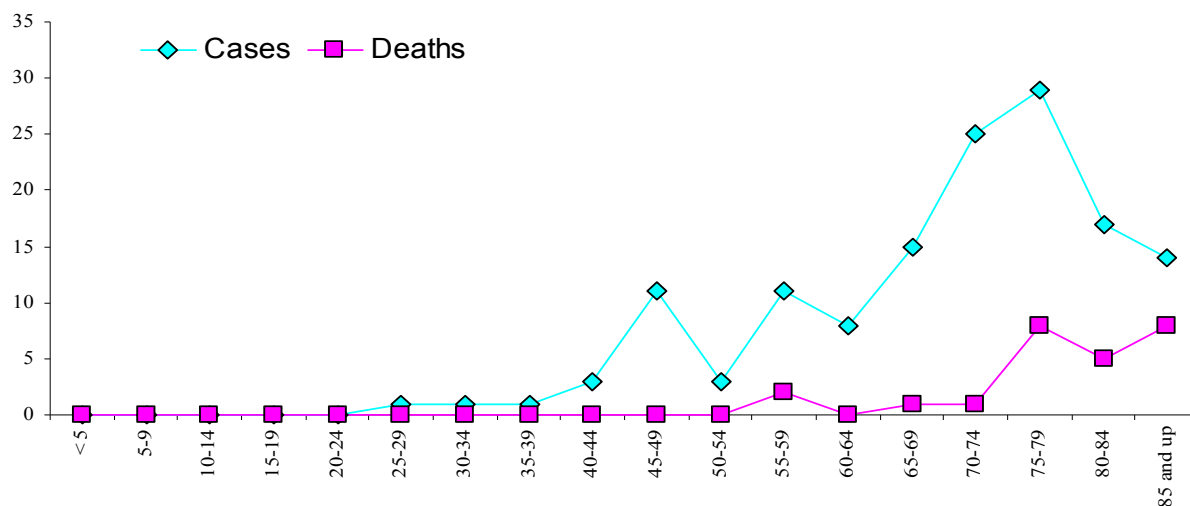
Risks and Associated Factors

Cigarette smoking accounts for 50 percent of bladder cancers in men and 25 percent in women with an average of 20 years between exposure and diagnosis. Occupational exposure to aniline dyes, benzene or 2-naphthalene, chronic infections such as *Schistosoma haematobium*, and calculus and diets low in fruits and vegetables are associated risk factors.

Early Detection and Prevention

There is no specific prevention except to stop smoking. Screening tests are neither available nor recommended for the general population.

Figure 16: Bladder cancer cases and deaths by age, South Dakota, 2000



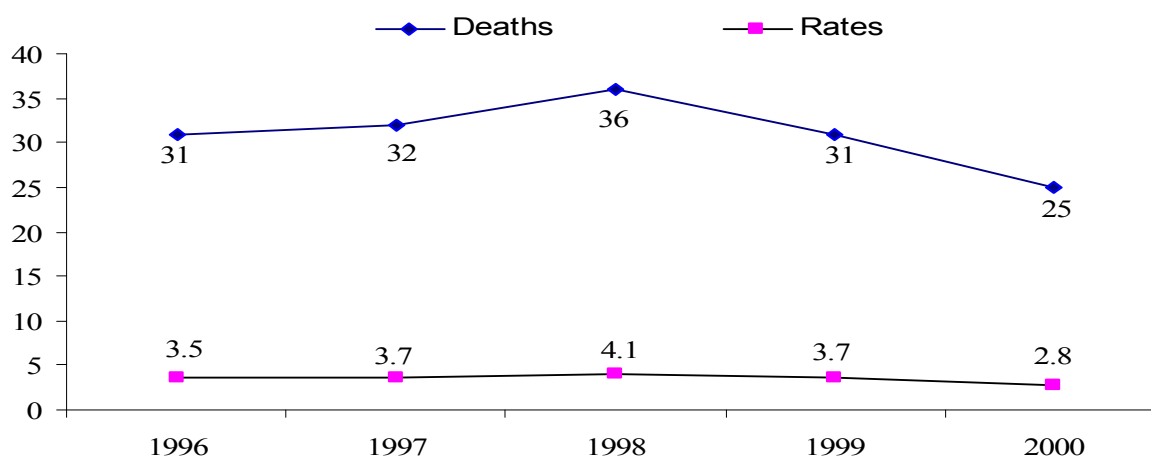
Source: South Dakota Department of Health

Table 15: Bladder cancer age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	2.8 ▼	2.9	0.0	3.6	3.7	2.4
United States *	4.3	4.5	1.3	4.4	4.5	1.5

Note: ▼ Significantly lower than the national rate. Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.
Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

Figure 17: Number of bladder cancer deaths and age-adjusted mortality rates, South Dakota, 1996-2000



Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: South Dakota Department of Health

Figure 17 illustrates the decline in bladder cancer deaths and decrease in mortality rate.

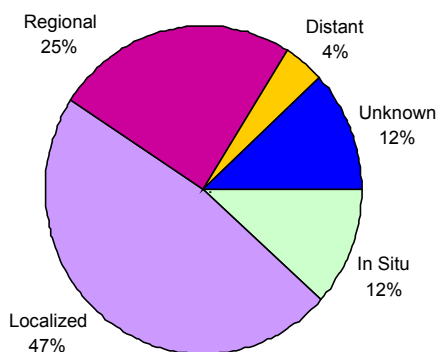
BREAST (FEMALE) South Dakota 2000

Incidence and Mortality Summary

	Females
No. of new invasive Cases	516
No. of new <i>in situ</i> Cases	68
South Dakota incidence ⁺	125.0
United States incidence*	135.1
Number of deaths	129
South Dakota mortality ⁺	27.9
United States mortality*	26.7
Healthy People 2010 Objective	22.3

Rates are per 100,000 persons, age-adjusted
⁺ Source: South Dakota Department of Health
^{*} SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Female



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Female breast cancer is the most common malignancy diagnosed in South Dakota accounting for 516 new cases, 17.2 percent of all cancer cases. It was the leading cancer diagnosis for women. Four hundred new cases of invasive breast cancer were expected. Even though the SDCR incidence data is incomplete (86 percent of expected), the number of new breast cancer cases has increased probably due to an aging population and improved and more widespread screening. White women have the highest incidence rate while American

Indian women had almost half the rate of white women in South Dakota.

Mortality: Breast cancer was the third most frequent cause of cancer deaths in South Dakota during 2000 with 129 deaths and 7.2 percent of cancer deaths. One hundred deaths were expected according to the American Cancer Society estimates. However, unlike the national trend, South Dakota's mortality rate for this cancer has increased. The five-year trend in mortality rates shows an annual percent change (APC) of 1.5 percent. American Indian women have a mortality rate of approximately 30 percent less than white women in South Dakota and slightly more than the national rate for their race. This indicates that the disparity in survival from breast cancer with the disease burden being higher on white women.

Risk and Associated Factors

Early onset of menarche, late onset of menopause, high fat diet, obesity, alcohol consumption; never pregnant, first full term pregnancy after age 30, history of fibrocystic disease, having a mother or sister with breast cancer, history of ovarian cancer or endometrial cancer, specific tumor suppressor genes such as BRCA1 and BRCA2 are all risk factors. White women in high socio-economic groups have increased risks. Known risk factors account for only 30 to 50 percent of breast cancers

Age is the single most important risk factor for breast cancer with rates increasing with age. Incidence rates for breast cancer may continue to rise because women who were born after World War II have a higher prevalence of risk factors than previous generations and will be reaching an age when their risks are higher. The risks of

women developing breast cancer by age⁶ are as follows:

By age 25	1 in 19,608
By age 30	1 in 2,525
By age 35	1 in 627
By age 40	1 in 217
By age 45	1 in 93
By age 50	1 in 50
By age 55	1 in 33
By age 60	1 in 24
By age 65	1 in 17
By age 70	1 in 14
By age 75	1 in 11
By age 80	1 in 10
By age 85	1 in 9
By age 85+	1 in 8

Early Detection and Prevention

Early detection and treatment remain the only effective methods for saving lives that this disease might otherwise claim. Periodic mammograms and clinical breast examination by a trained health care professional offer substantial benefit in detecting tumors early in their development, when they are extremely small in size and without symptoms. Early diagnosis increases treatment options and improves overall survival. The American Cancer Society guidelines are as follows:

1. Women age 40 and older should have a screening mammogram every year, and should continue to do so for as long as they are in good health.
2. Women in their 20s and 30s should have a clinical breast examination (CBE) as part of a periodic (regular) health exam by a health professional preferably every 3 years. After age 40, women should have

a breast exam by a health professional every year.

3. Women at increased risk should talk with their doctor about the benefits and limitations of starting mammograms when they are younger, having additional tests, or having more frequent exams. Women should discuss with their doctor what approaches are best for them. Although the evidence currently available does not justify recommending ultrasound or MRI for screening, women at increased risk might benefit from the results.

The Healthy People 2010 objective 3:13 for women over 40 years of age and older who have received a mammogram within the preceding two years is 70 percent. In 2000, both the South Dakota and national rates were 76 percent.⁷

According to data from the 2000 Behavioral Risk Factor Surveillance System (BRFSS) Online Prevalence Data 1995-2001 <http://apps.nccd.cdc.gov/brfss/> mammogram screening was as follows:

1. Percentage of women who had never had a mammogram was 39.8 percent in South Dakota and 37.8 percent nationwide.
2. Percentage of women who had a mammogram as part of a routine checkup, because of a breast problem other than cancer, or because of cancer were as follows:
South Dakota: 89.4 percent had a mammogram as a routine checkup; 8.2 percent had a breast problem other than cancer; and 2.4 had breast cancer.
Nationwide: 89.2 percent had a mammogram as a routine checkup; 8.3 percent had a breast problem other than cancer; and 2.3 had breast cancer

⁶ Cancer Medicine 5th Edition, American Cancer Society 2000, Page 1739

⁷ BRFSS Online Trend Data 1995-2001 <http://apps.nccd.cdc.gov/brfss/trends>

3. Percentage of women who have never had a clinical breast exam was 8.6 percent in South Dakota and 10.2 percent nationwide.
4. Percentage of breast exams done as part of a routine checkup, because of a breast problem other than cancer, or because of cancer are as follows:

South Dakota: 96 percent had a breast exam as part of a routine check-up, 3 percent had a breast problem other than cancer; and 1.1 percent had breast cancer.

Nationwide: 94.7 percent had a breast exam as part of a routine check-up, 3.8 percent had a breast problem other than cancer; and 1.3 percent had breast cancer.

5. The percentage of women 40 years and older who have never had a mammogram and clinical breast exam was 16.8 percent in South Dakota compared to 18.0 percent nationwide.⁸

The South Dakota Department of Health uses federal funding for breast cancer screening for women 50 to 64 years old and within income guidelines as determined annually. The *All Women Count!* Breast and Cervical Cancer Control Program is available to any woman in South Dakota who meets the criteria. The BCCCP has done 3,929 mammograms on women since its inception to the end of 2000 and found 9 *in situ* and 40 invasive breast cancers. Some of the same women had repeat mammograms in different years and are included in the count for each year. If the same woman had more than one mammogram in one year, she is included only once for that year. The data for the BCCCP by year is as follows:

Year	Number of Women	Breast Cancer Diagnosis	
		<i>In Situ</i>	Invasive
1997	366	0	2
1998	506	1	7
1999	633	3	5
2000	684	0	8
2001	746	1	9
2002	800	2	9

Information for this program can be found by calling **1-800-738-2301** or at the following URL:

www.state.sd.us/doh/Disease2/cancer.htm

Figure 18 shows that many cases are being diagnosed among women in their thirties and this trend increases with age, with a peak at the young age group, 45-59 years. Figure 19 shows increases in both incidence and mortality in 2000.

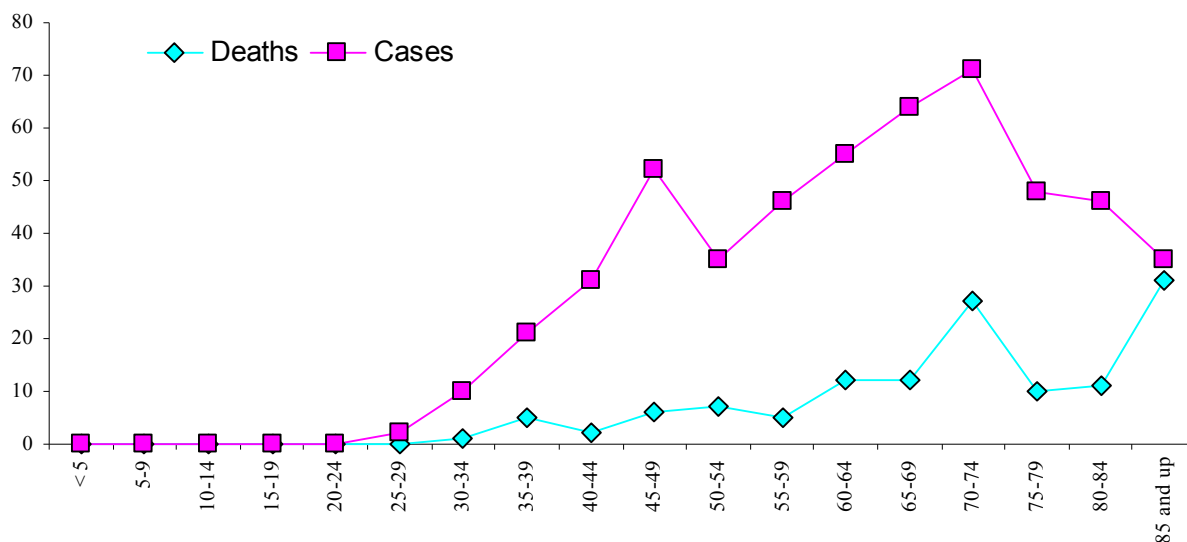
Figure 19 illustrates the increasing trend in new cases diagnosed probably due to improved and more widespread screening. The increasing trend in mortality could be because some cancers are still being detected too late or are being detected but not treated early or appropriately.

MALE BREAST CANCER SOUTH DAKOTA 2000

There were 4 cases of male breast cancer with an incidence rate of 1.2 and 1 death with a mortality rate of 0.3. The national rate for incidence is 1.1 and mortality is 0.3. In 2000, an estimated 1,400 new cases and 400 deaths due to breast cancer were expected among men in the United States.

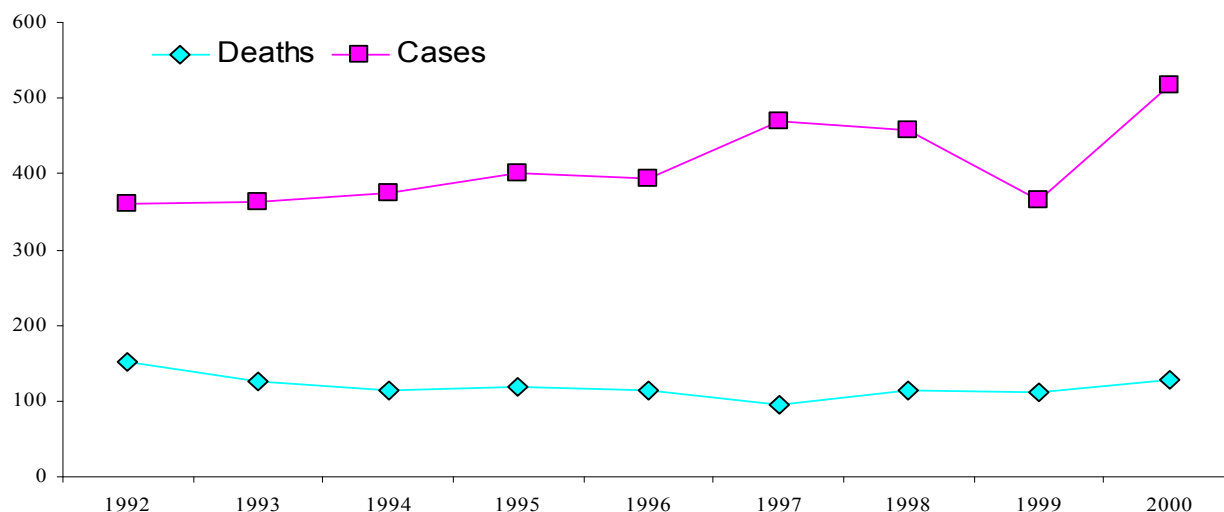
⁸ BRFSS Online Trend Data 1995-2001
<http://apps.nccd.cdc.gov/brfss>

Figure 18: Female breast cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Figure 19: Female breast cancer cases and deaths, South Dakota, 1992-2000



Source: South Dakota Department of Health

Table 16: Breast cancer age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	27.9	28.9	13.8	24.6	25.0	17.6
United States *	26.7	26.3	13.7	27.6	27.2	14.9

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

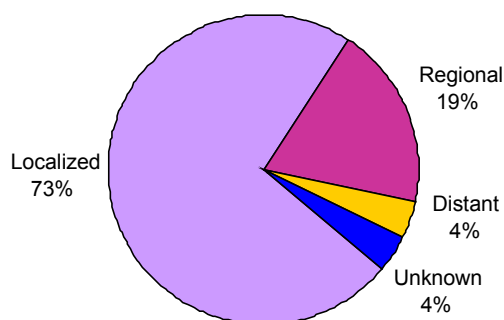
CERVIX UTERI South Dakota 2000

Incidence and Mortality Summary

	Females
No. of new invasive Cases	26
South Dakota incidence ⁺	6.9
United States incidence*	7.6
Number of deaths	10
South Dakota mortality ⁺	2.3
United States mortality*	2.8
Healthy People 2010 Objective	2.0

Rates are per 100,000 persons, age-adjusted
⁺ Source: South Dakota Department of Health
^{*} SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Cervix Uteri



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Invasive cervical cancer accounted for approximately 0.5 percent of new cases. The incidence rate with 86 percent completeness is slightly lower than the national rate. The median age for cervical cancer is one of the youngest and over 60 percent of the cases are under 50 years old. In South Dakota in 2000, women ages 25-29, 35-39, 45-49 and 70-74 had the highest number of cases. The incidence rate with 86 percent reporting is 3 times higher (19.2) for American Indians than both the total (6.9) and white (6.6) rates in South Dakota. Early diagnoses such as *in situ* or localized stages result in the best outcomes. Seventy-three percent of the

cervical cancer that was reported in 2000 was at localized stages; 19 percent or 5 cases were at regional stage; and 4 percent or 1 case was at distant stage. The SDCR does not collect carcinoma *in situ* (CIS) or cervical intraepithelial neoplasia (CIN III) of the cervix.

Mortality: Cervical cancer accounted for 0.5 percent of cases and the rate is lower than the national rate. The mortality data shows American Indians with a 6 fold rate when compared to whites and to the South Dakota total. This disparity was not statistically significant but has been an on going problem for many years. The most deaths occurred in the 60-64 and over 85 age groups. Overall the trend in the five-year mortality rate shows a decline with an average percent change (APC) of -1.9 percent.

Risk and Associated Factors

Smoking, intercourse at an early age, multiple sexual partners, sexually transmitted diseases and Human Papilloma Virus are known risk factors. Smoking is considered an associated risk factor.

Early Detection and Prevention

Regular use of Pap testing⁹ reduces deaths from cervical cancer. Women who have not been screened face a three to ten fold higher risk of developing invasive cervical cancer. Cure rates are nearly 100 percent when diagnosed at the pre-invasive stage. Screening should begin about three years after a woman begins having sexual intercourse or no later than 21 years old. Women 70 years of age or older who have

⁹ A Pap test or smear involves collecting cells from outside the cervix with a spatula and from the endocervix with a brush at the opening of the uterus or womb to check for changes using a special satin developed by George Papanicoulou.

had 3 or more normal Pap smears in a row and no abnormal Pap smear results in the last 10 years may choose to stop having cervical cancer screening. Women with a history of cervical cancer, diethylstilbestrol (DES) exposure before birth, HIV infection or a weakened immune system should continue to have screening.

Regular use of Pap testing reduces deaths from cervical cancer. Women who have not been screened face a 3 to 10 fold risk of developing invasive cervical cancer. Older, poor, less educated women and new immigrant women are less likely to be screened and are at a greater risk of dying. Cervical cancer is 100 percent curable when found early.

Healthy People 2010 Objective 3-11a is 97 percent for women 18 years and older who have ever received a Pap test. South Dakota's screening rate is 96.4 percent, which is higher than the U.S. rate of 94.8 percent.

Healthy People 2010 Objective 3-11b is 90 percent for women age 18 and older, who have received a Pap test within the preceding three years. South Dakota's rate is 88.5 percent and the U.S. rate is 86.8 percent. South Dakota ranks eleventh in the nation in cervical cancer screening.¹⁰

Table 17 shows that screening rates by race using Papanicoulou in South Dakota do not show disparities. In fact, American Indian women have a screening rate that is higher, 90.8 percent, than the rest of South Dakota, 88.5 percent, and white women, 88.5 percent. This would indicate that perhaps screening is not the problem but patterns of care.

Disparities do exist when looking at screening rates by age and income, Tables 18 and 19. When looking at the age-specific cases and death graph, Figure 20, it might be possible that the younger and older age groups are not receiving screening and care. This might be across the population and not necessarily among one racial group. BRFSS prevalence data shows that South Dakota's screening rates for all income groups are higher than the national average in all income categories. However, lower income women are also screened less than high income women.

The state of South Dakota has an active breast and cervical cancer control program (BCCCP) *All Women Count!* that offers Pap smears to women 30 – 64 years old depending on family size and income levels less than 200 percent of the federal poverty guidelines. The program has network providers in virtually all counties. Presently 251 clinics, hospitals, and laboratories provide services in South Dakota through the program. Information is available at 1-800-738-2301. Since its inception, it has provided Pap smears to hundreds of South Dakota women. Follow-up with the abnormal smears resulted in one *in situ* and 3 invasive cervical cancers. This program is critical in providing services to the underserved and in reducing incidence and mortality rates. Screening numbers for Pap smears and results are presented in Table 20.

¹⁰ Tied with Rhode Island and not including the District of Columbia (D.C.). Twelfth if D.C. is included.

Table 17: Percentage ≥ 18 years old, who had a Pap smear within the past 3 years by race, South Dakota and U.S., 2000

Race	South Dakota %	U.S. %
Total	88.5	86.8
White	88.5	87.1
American Indian	91.8	---

Source: BRFSS Online Prevalence Data 1995-2001 <http://apps.nccd.cdc.gov/brfss/>
BRFSS 2000, South Dakota Department of Health.

Table 18: Percentage who had a Pap smear within the past 3 years by age, South Dakota and U.S., 2000

Age in years	South Dakota percentage	United States percentage
18-39	91.6	88.9
40-49	89.7	89.1
50-59	91.1	89.0
60-64	85.1	84.3
65+	77.7	74.4

Source: BRFSS Online Prevalence Data 1995-2001 <http://apps.nccd.cdc.gov/brfss/>

Table 19: Percentage who had a Pap smear within the last 3 years by income, South Dakota and U.S., 2000

Income	South Dakota percentage	United States percentage
Less than \$15,000	78.9	76.9
\$15,000 -24,999	87.3	82.7
\$25,000-34,999	91.6	87.7
\$35,000-49,000	92.8	89.3
\$50,000 plus	93.7	93.3

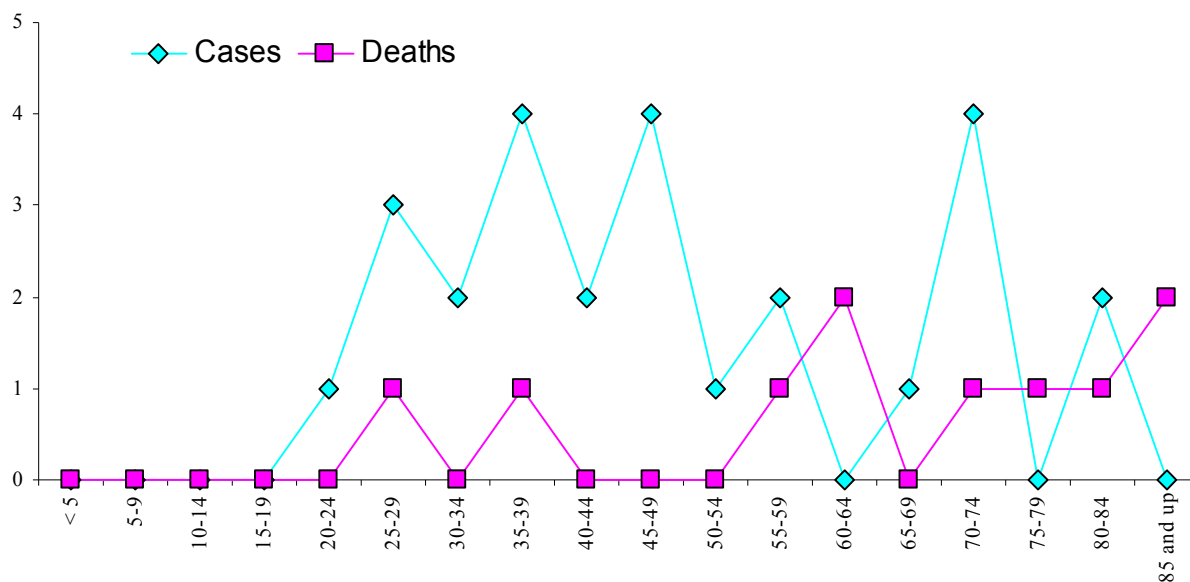
Source: BRFSS Online Prevalence 1995-2001 <http://apps.nccd.cdc.gov/brfss/>

Table 20: Pap Smears done by *All Women Count!* BCCCP, South Dakota, 1998-2000

Year	Pap Smears	Abnormal
1998	702	18
1999	740	12
2000	1114	15

Source: All Women Count! BCCCP, South Dakota Department of Health

Figure 20: Cervix uteri cancer cases and deaths, South Dakota, 2000



Source: South Dakota Department of Health

Table 21: Cervical cancer age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	2.3	1.9	12.1	2.0▼	1.7▼	9.4▲
United States *	2.8	2.5	2.8	3.0	2.7	2.9

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

▼ significantly lower than the national rate

▲ significantly higher than the national rate

Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

Table 22: Cervical cancer age-adjusted mortality rates by race and year, South Dakota and U.S., 1996-2000

	1996		1997		1998		1999		2000	
	SD+	US*	SD+	US*	SD+	US*	SD+	US*	SD+	US*
Total	2.2	3.2	2.4	3.1	1.4	3.0	1.8	2.8	2.3	2.8
White	2.1	2.9	1.5	2.8	1.5	2.6	1.4	2.6	1.9	2.5
American Indian	7.4	3.5	12.1	4.0	0.0	2.7	14.9	1.8	12.1	2.8

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health * SEER Cancer Statistics Review 1975-2000

COLORECTAL South Dakota 2000

Incidence and Mortality Summary

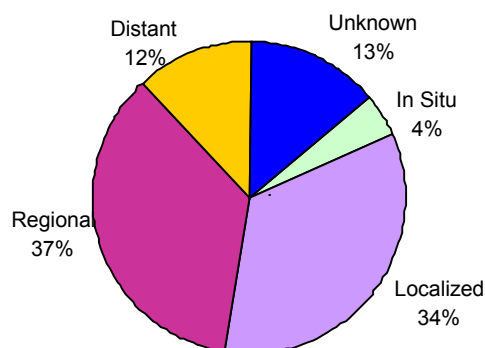
	Total	Males	Females
No. of new invasive cases	404	191	213
No. of new <i>in situ</i> cases	19	10	9
South Dakota incidence ⁺	49.1	53.4	45.3
United States incidence*	53.1	62.5	45.9
Number of deaths	207	92	115
South Dakota mortality ⁺	24.4	26.6	23.1
United States mortality*	20.8	25.2	17.6
Healthy People 2010 Objective	13.9		

Rates are per 100,000 persons, age-adjusted

+ Source: South Dakota Department of Health

- SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Colorectal



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Colorectal cancer was the third leading cancer reported accounting for 404 invasive cancers, 13.5 percent of new cases. South Dakota expected about 400 new cases. Almost 50 percent were diagnosed at the late regional and distant stages. It was the second leading cause of cancer deaths with 12.0 percent of cancer deaths.

Mortality: Colorectal cancer accounted for 207 deaths, 12 percent of all deaths due to cancer. South Dakota expected 200 deaths of colorectal cancer in 2000. South Dakota's age-adjusted mortality rate is higher than the U.S. rate. South Dakota

whites also have significantly higher rates than others in South Dakota and compared to whites nationally. American Indians have twice their national mortality rate. This would indicate that South Dakota does have a problem with colorectal cancer for all races but more so among the white population. Colorectal cancer deaths are decreasing nationally but in South Dakota the trend in the five-year mortality rates from 1996-2000 is positive with an annual percent change (APC) of 2 percent. Men have higher rates than women and both new cases and deaths increase with age, the majority occurring after age 50.

Risk and Associated Factors

Risk factors include family or personal history, a history of irritable bowel disease or breast or reproductive cancers, obesity, red meat, alcohol and low vegetable consumption contributes to increased risk, smoking and lack of physical activity. Aspirin use, calcium intake and hormone replacement therapy may reduce risk

Early Detection and Prevention

Colorectal cancer screening is recommended for all persons over 50 years, or earlier for persons at risk. Current guidelines¹¹ are:

- A fecal occult blood test (FOBT) yearly; or
- A flexible sigmoidoscopy (FSIG) every five years; or
- Annual FOBT and a FSIG every five years; or
- A double contrast enema every five to 10 years; or
- A colonoscopy every ten years.

These guidelines apply for persons without symptoms, who are at average risk for the disease. People at increased or high risk

¹¹ American Cancer Society 2002

should talk with their doctor about different screening schedules

Healthy People 2010 objective 3-12a is to increase the adults aged 50 years and older who have a fecal occult blood test (FOBT) within the preceding two years to 50 percent.¹² South Dakota's rate is 31.0 percent within the preceding two years of the survey in 2001.¹³

Overall 43.8 percent of South Dakotans

had a FOBT prior to the survey compared to 44.6 percent nationwide. Seventy-two percent of South Dakotans who ever had a FOBT reported having it within the past two years, indicating increased awareness.

Healthy People 2010 objective 3-12b is 50 percent for adults who have ever received a sigmoidoscopy.¹² South Dakota's rate is 45 percent for 2001.¹⁴

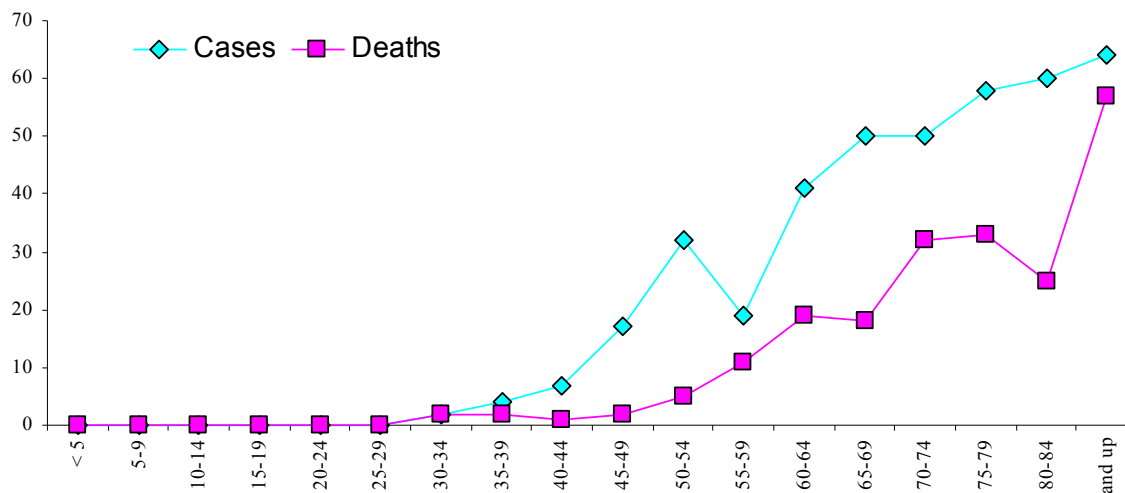
Table 23: Colorectal cancer mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	24.4 [▲]	24.6 [▲]	23.9	23.2 [▲]	23.1 [▲]	25.3
United States *	20.8	20.2	13.5	21.2	20.7	14.7

Note: [▲] SD rate is statistically significant higher than national rates. Rates are per 100,000 persons.

Source: + South Dakota Department of Health * SEER Cancer Statistics Review 1975-2000

Figure 21: Colorectal cancer cases and deaths by age, South Dakota, 2000



¹² FOBT is referred to as a stool blood test in the BRFSS survey.

Colonoscopy is fast replacing sigmoidoscopies as the test of choice for endoscopy, thus the question now includes both. At the time Healthy People 2010 was written, colonoscopy was not a common test. No questions for colorectal cancer screening were included in the 2000 BRFSS.

¹³ Source: South Dakota BRFSS, 2001.

¹⁴ Source: BRFSS Online Prevalence 1995-2001
<http://apps.nccd.cdc.gov/brfss/>

CORPUS AND UTERUS, NOS South Dakota 2000

Incidence and Mortality Summary

	Females
No. of new invasive cases **	89
No. of <i>in situ</i> cases	4
South Dakota incidence ⁺	21.9
United States incidence*	23.9
Number of deaths **	15
South Dakota mortality ⁺	3.3
United States mortality*	4.1

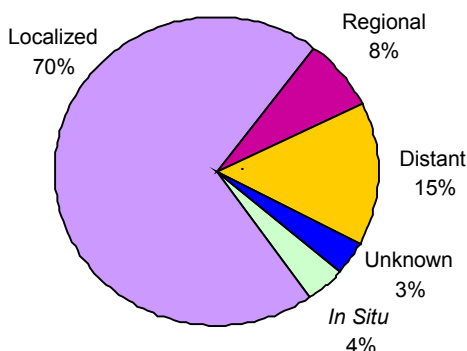
Rates are per 100,000 person, age-adjusted

+ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

** includes 1 Uterus, NOS ** includes 8 Uterus, NOS

Stage at Diagnosis - Corpus and Uterus, NOS



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Cancer of the uterus, sometimes referred to as endometrial cancer, is the most common gynecologic cancer in the United States and the fourth most common cancer in U.S. women. It is the fifth most common cancer among women worldwide and the seventh most common cancer. It accounted for 3.0 percent cases of cancer cases reported. Most cases in South Dakota are diagnosed at the localized stage and at this stage, the survival rate is 96 percent. At the regional stage, survival is 65 percent. There was no difference in the incidence rates for the American Indian, 21.6 and whites, 20.6 with 86 percent completeness in 2000.

More than half the diagnoses occur in women over 50.

Mortality: Deaths were 0.5 percent of cancer deaths. The American Indian rate is approximately one third more than the rate for whites in South Dakota during the same five year period and twice that of the national rate for American Indian women. Even though the American Indian rate is four times that of the white rate during 2000, it was not significant statistically. Half the deaths occur in women over 65 years of age or older. Mortality rates have declined over the five year period 1996-2000 with an annual percent change (APC) of -5.4 percent.

Risk and Associated Factors

Chronic exposure to estrogen over a lifetime increases risk. Factors such as tamoxifen therapy for breast cancer, diabetes mellitus and hypertension, few or no children, genetic predisposition, and previous cancer of the breast, colon or ovary, are associated with increased risks.

Note: The risk of developing uterine cancer is actually higher than the rates reported because the denominator used to calculate the rates are all women. Only women with a uterus can develop uterine cancer and those who have had hysterectomies cannot. Since the number of women without a uterus is unknown, the denominator is higher than it should be and this would give a lower rate.

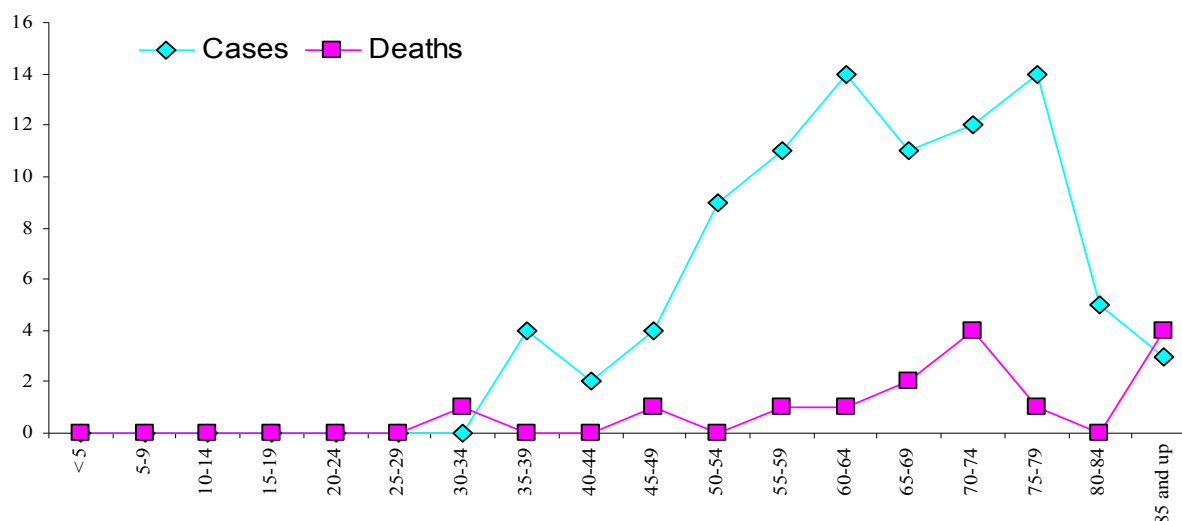
Early Detection and Prevention

There is no equivalent screening test for endometrial cancer as the Pap smear and its essential role in screening for cervical cancer. Possible signs of endometrial cancer include unusual vaginal discharge or pain in the pelvis. A woman should see her doctor if any of the following problems occur:

- Bleeding or discharge not related to menstruation (periods).
- Difficult or painful urination.
- Pain during sexual intercourse.
- Pain in the pelvic area.

To diagnose endometrial cancer, a sample of endometrial tissue must be removed using endometrial biopsy or by dilatation and curettage.

Figure 22: Corpus and uterus, NOS cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 24: Corpus and uterus, NOS age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	3.3	3.0	12.1	3.5	3.4	4.9
United States *	4.1	3.8	2.4	4.1	3.8	2.2

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health * SEER Cancer Statistics Review 1975-2000

KIDNEY AND RENAL PELVIS South Dakota 2000

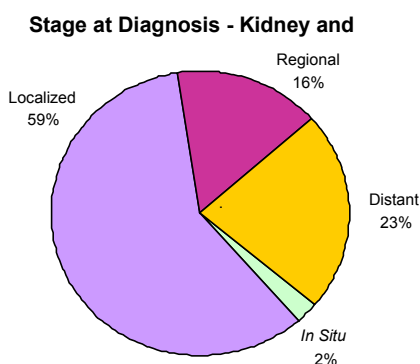
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	81	43	38
No. of new <i>in situ</i> cases	2	0	2
South Dakota incidence ⁺	10.2	11.9	8.6
United States Incidence*	12.1	16.9	8.3
Number of Deaths	36	20	16
South Dakota Mortality ⁺	4.3	5.5	3.0
United States Mortality*	4.2	6.2	2.8

Rates are per 100,000 persons, age-adjusted

⁺ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: In 2000 in South Dakota, kidney and renal pelvic cancers were the eight leading cancer reported to the SDCR with 2.5 percent of observed cases. Only 1 childhood kidney cancer was reported. All ages are at risk for these cancers. Most cases occur in older people except for Wilm's tumor (nephroblastoma), which affects mostly children under 5 and accounts for the majority of childhood kidney cancers. Renal cell carcinomas are 80 percent of adult kidney cancers. Men are affected twice as often as women. Nationally incidence is the same but this is not apparent with the South Dakota numbers at 86 percent case completeness.

Mortality: This cancer was the tenth leading cause of death by cancer with 2.1 percent of all cancer deaths. Only 1 childhood kidney cancer was reported. Mortality rates are twice as high for men as for women. By race, there is no difference between rates for whites and American Indians. South Dakota's five year rate is slightly higher than the national rate and the mortality rate has been approximately the same for each year during 1996-2000.

Risk and Associated Factors

Tobacco use is strongly associated with adult kidney cancer. Obesity is positively associated as well as occupational exposure to aniline dyes, benzene or 2-naphthalene. Approximately 1 percent cluster in families.

Early Detection and Prevention

Since it is difficult to diagnose renal cancer until it becomes symptomatic, many cases are diagnosed at later stages when treatment is more difficult. Symptoms include sporadic blood in the urine and sometimes pain when approximately one third would have already metastasized. The only preventive measure is for adults to quit smoking.

Figure 23: Kidney and renal pelvis cancer cases and deaths by age, South Dakota, 2000

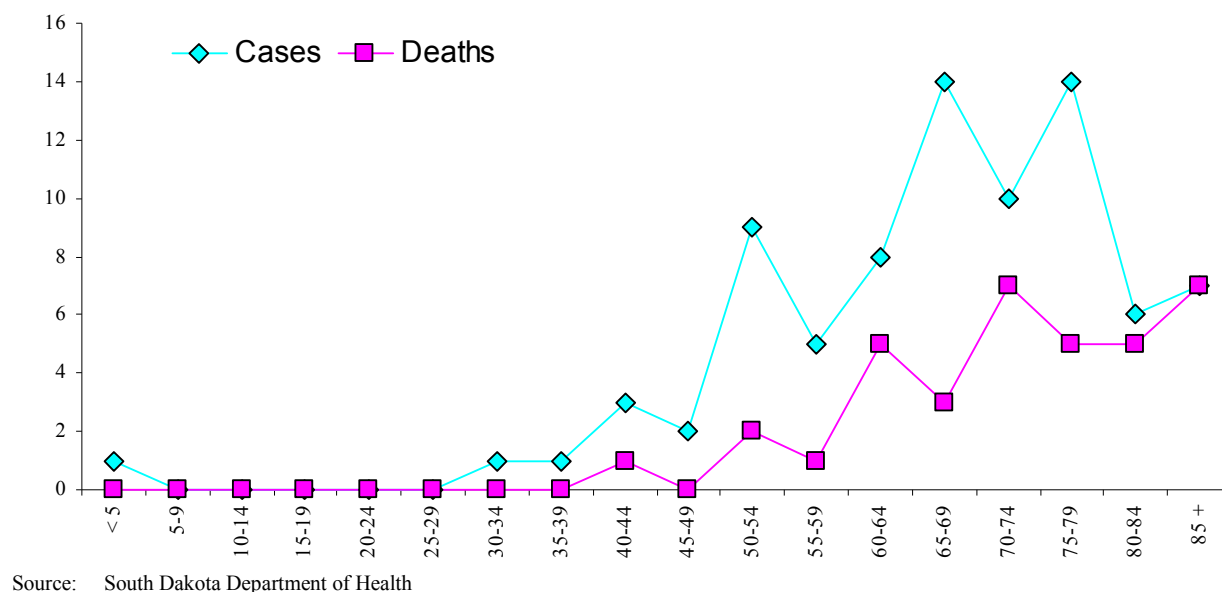


Table 25: Kidney and renal pelvis cancer age-adjusted mortality rates by race,

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	4.3	4.3	2.0	4.7	4.7	4.8
United States *	4.2	4.3	3.9	4.2	4.2	4.7

South Dakota and U.S., 2000 and 1996-2000

Note: Rates are per 100,000 persons

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

LEUKEMIA

South Dakota 2000

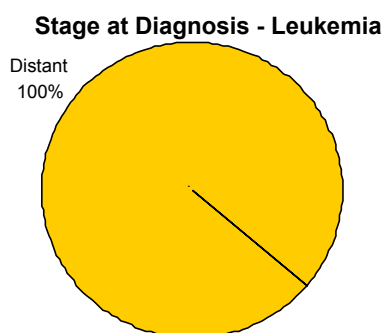
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	69	47	22
South Dakota incidence ⁺	8.7	12.9	4.9
United States incidence*	12.2	16.0	9.5
Number of deaths	66	38	28
South Dakota mortality ⁺	7.7	10.5	5.5
United States mortality*	7.7	10.3	5.9

Rates are per 100,000 persons

+ Source: South Dakota Department of Health

- SEER Cancer Statistics Review 1975-2000



Note: Leukemia is a systemic disease and is, therefore, only diagnosed at distant stage.

Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Leukemias are a diverse group of cancers and are sub-typed by histology. Subtypes have different etiology, treatment and prognosis. Leukemias accounted for 2.3 percent of all cases reported to the SDCR. The most common types reported were acute myeloid and chronic lymphocytic leukemias (CLL). Leukemia is a common childhood cancer. However, most cases occur in adults. Children under 19 have a higher incidence than ages 20 -34 years and incidence increases with age over 35 years old. Leukemias might be under reported in 2000 because many are either diagnosed and treated in physicians' offices or diagnosed and referred to out of state cancer centers.

The SDCR is improving case ascertainment efforts in order to collect all cancers.

Mortality: Leukemia accounted for 4.3 percent of cancer deaths with acute myeloid leukemia being the most frequent cause of leukemia deaths. Overall, the 1 year survival rate is 64 percent and this drops to 43 percent in five years because of poor survival with leukemias such as the myeloid type. The mortality rate for children is decreasing because of treatment advances. Survival for children increased from 53 percent to 81 percent in the early nineties. Whites have higher mortality rates than American Indians for leukemias both in South Dakota and nationally. Trends for the five years 1996-2000, in mortality for leukemia show a slight increase with an annual percent change (APC) of 0.82 percent.

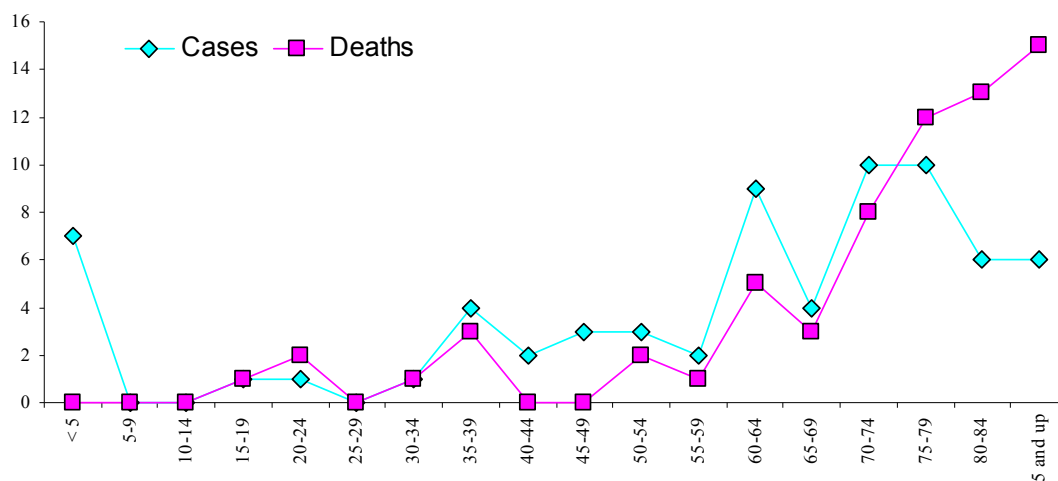
Risks and Associated Risk Factors

Causes for most of these cancers are unknown. Occupational exposures to benzene and radiation, certain chromosomal abnormalities, such as Down's syndrome, human T-cell lymphocytic virus type I (HTLV-I) and cigarette smoking may be associated with leukemias. Childhood leukemias in the early years may be related to genetic factors and certain prenatal post natal exposures.

Early Detection and Prevention

There are no early detection or prevention strategies. Often symptoms are the same as for many other health problems thus early detection is difficult. Diagnosis is made using blood tests and bone marrow biopsies.

Figure 24: Leukemia cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 26: Leukemia age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	7.7	7.9	0.0	8.2	8.3	4.8
United States *	7.7	7.9	4.5	7.7	7.9	4.0

Note: Rates are per 100,000 persons

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

LUNG AND BRONCHUS

South Dakota 2000

Incidence and Mortality Summary

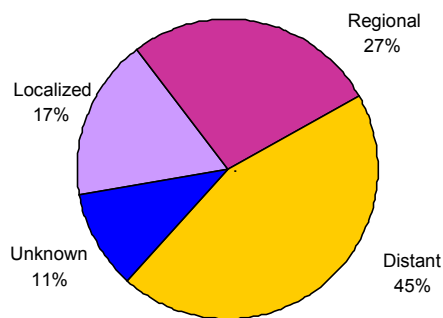
	Total	Males	Females
No. of new invasive cases	378	215	163
No. of new <i>in situ</i> cases	0	0	0
South Dakota incidence ⁺	47.3	59.6	37.8
United States incidence*	62.3	79.8	49.8
Number of deaths	396	249	147
South Dakota mortality ⁺	47.9	69.4	31.9
United States mortality*	56.1	76.9	41.2
Health People 2010 Objective	44.9		

Rates are age-adjusted per 100,000 persons

Source: + South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Lung &



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Lung and bronchus cancer cases were the leading non-gender specific cancer reported during 2000. There were 378 cases out of an expected 400, with an age-adjusted incidence rate of 47.3 per 100,000 persons. Lung cancer incidence rates increase with age. Deaths reported were 396 and the estimate for 2000 was 400. This cancer was the leading cause of cancer deaths for both men and women in South Dakota.

Mortality: The age-adjusted mortality rate of 47.9 is below the United States rate of 56.1. American Indian mortality rates (90.7) are almost twice as high as the South Dakota's total (47.9) and white (46.3) rates for year

2000, and are statistically significant. For the five year period, 1996-2000, it is twice the national rate for American Indians and 1.6 that of the total South Dakota and white rates. The trend for the five year mortality for South Dakota total shows a decrease with an annual percent change (APC) of -2.4 percent. There are clearly disparities on how the lung and bronchial cancer burden affects the different races in South Dakota.

The 5-year survival rate for all stages combined is only 14 percent. However, the 1-year relative survival has increased due to improvements in treatment. The incidence and mortality are higher in males than in females but the gap is closing. Generally, the incidence and mortality are higher among minorities and lower income groups. Nationally, lung cancer incidence and mortality rates have decreased over the last 30 years. However, the rate of decrease for women lags behind that of men. South Dakota like the entire US has not met Healthy People 2010 objective.

Risk and Associated Factors

Cigarette smoking, including exposure to second hand smoke, is the most important risk factor accounting for 68 to 78 percent of lung cancer deaths among females and 88 to 91 percent among males; Occupational or environmental exposures such as radon, asbestos, coal tars, crystalline silica and polycyclic aromatic hydrocarbons increase risk. One to two percent of lung cancer deaths are attributable to air pollution.

Early Detection and Prevention

There are no recommendations for screening. Early detection of lung cancer is difficult because symptoms usually do not appear until the disease is advanced. The best prevention is to quit smoking. Smoking is responsible for 66 percent of lung cancers. Treatment options may involve a

combination of surgery, radiation and chemotherapy because of late stage diagnoses. Research is now being conducted to see whether spiral computed tomography would be a viable option for early detection.

Cigarette smoking is by far the most important risk factor in the development of lung cancer. The decline in tobacco use by adults has slowed, but tobacco use by youths is increasing. In 2000, the BRFSS in South Dakota found that 21.9 percent of the adult population smoked cigarettes. The Healthy People 2000 objective was 15 percent. By gender, 22.5 percent of males smoke cigarettes compared to 21.3 percent of females. By age groups, young people 18 to 24 years have the highest smoking rates, 30.7 percent for males and 31.5 percent for females. By race, American Indians have the highest smoking rates at 41.1 percent.

Preliminary results of the South Dakota 2002 Adult Tobacco Survey indicated that 22.9 percent of adults were smoking cigarettes. The Healthy People 2010 objective is to reduce the number of smokers 18 years and older to no more than 12 percent.

In 2001, the Youth Risk Behavior Survey (YRBS) in South Dakota among non-Indian schools found that 33 percent of high school students smoke, 34 percent of girls and 32 percent of boys. In 2000, the American Indian YRBS in Bureau of Indian Affairs (BIA) schools found that 47 percent of middle school students and 43 percent of high school students smoked cigarettes during the 30 days prior to answering the questionnaire. According to the 2000 Youth Tobacco Survey (YTS), the national youth smoking rate is 28.4 percent for all high school students, and 11.8 percent of males use spit tobacco. If current smoking trends continue, 20,000 South Dakota young people

alive today will die from smoking related diseases.¹⁵

Nationally, teen smoking rates have been dropping since 1997 when the rate was 36 percent to 28.4 percent in 2001.¹⁶ The data is from the Youth Risk Behavior Survey (YRBS), a national school-based survey of 14,601 students in grades 9-12 that was conducted in spring 2001. Other findings:

- The number of teens who said they had smoked is down. In 1999, 70 percent said they'd tried cigarette smoking; in 2001, 64 percent said the same.
- Those who said they were frequent smokers — they smoked on at least 20 of the 30 days before the survey — dropped from 17 percent in 1999 to 14 percent in 2001.
- White and Hispanic students are more likely to be smokers than black students.

¹⁵ <http://www.sdtobaccofree.org>

¹⁶ MMWR Surveillance Summaries, June 28, 2002/51(SS04); 1-64

Figure 25: Lung and bronchus cancer cases and deaths by age, South Dakota, 2000

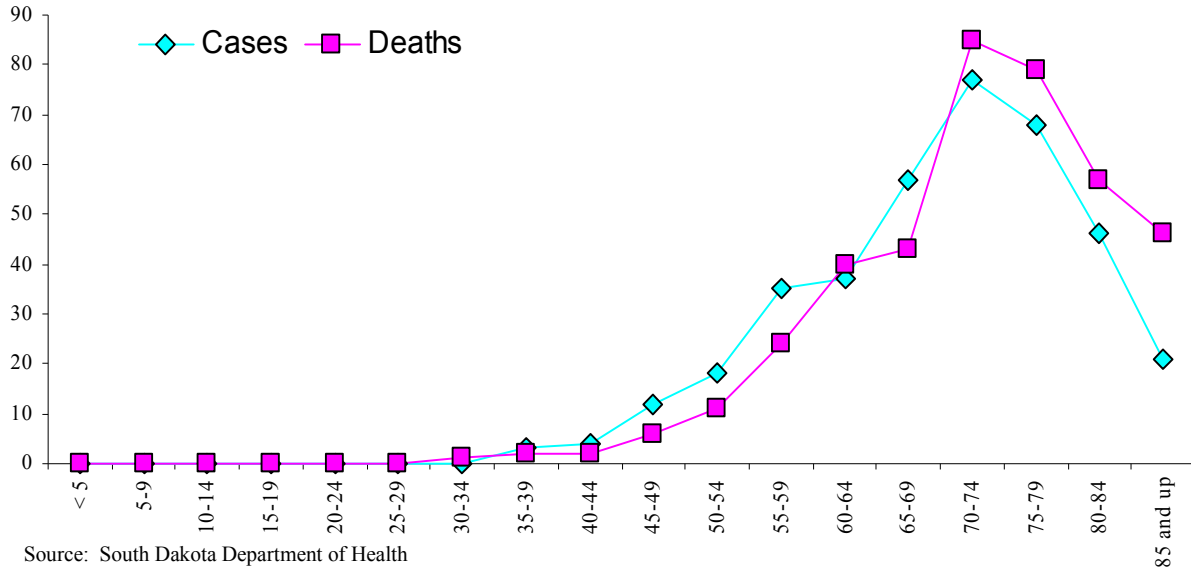


Figure 26: Lung and bronchus cancer cases and deaths, South Dakota, 1992-2000

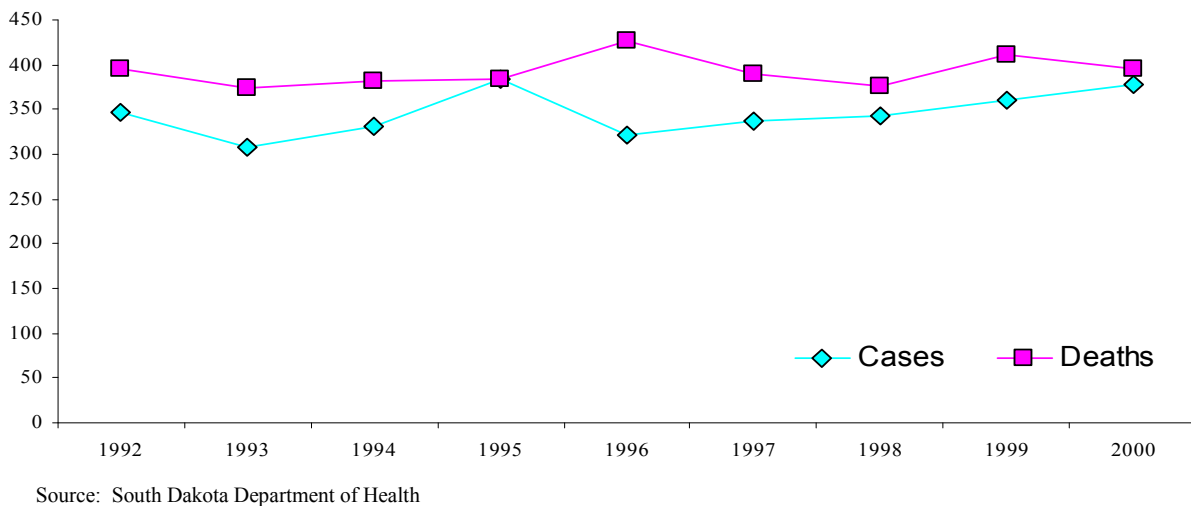


Table 27: Lung and bronchus age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	47.9▼	46.3▼	90.7▲	48.8▼	47.7▼	78.5▲
United States *	56.1	56.2	32.6	56.8	56.7	37.2

Note: ▼ Significantly lower than the national rate. ▲ Significantly higher than the national rate.

Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health;

• SEER Cancer Statistics Review 1975-2000

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MELANOMA (SKIN) South Dakota 2000

Incidence and Mortality Summary

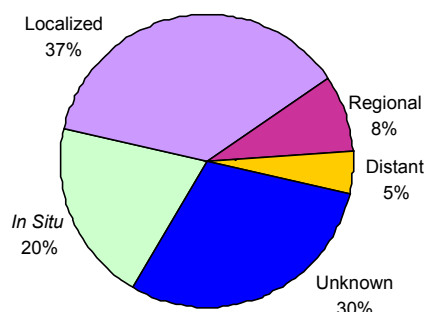
	Total	Males	Females
No. of new invasive cases	67	37	30
No. of new <i>in situ</i> cases	17	10	7
South Dakota incidence ⁺	8.8	10.3	8.1
United States incidence*	17.7	22.5	14.4
Number of deaths	16	9	7
South Dakota mortality ⁺	2.0	2.6	1.7
United States mortality*	2.7	3.8	1.8
Healthy People 2010 Objective	2.5		

Rates are per 100,000 persons

⁺ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Melanoma (Skin)



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Invasive melanoma of the skin accounts for 2.2 percent of the cancers reported to the SDCR. Stage at diagnosis indicates that only 13 percent were at late stages, regional and distant. Melanoma incidence increases with age and is generally higher among men than women. Melanoma is primarily a cancer of white populations and ethnic background is determinant among this population. Melanoma rates are 20 times higher in Caucasians than in Blacks, and this disparity will continue to exist as long as the people at risk ignore prevention guidelines.

Mortality: Deaths were 1.3 percent of cancer deaths. The five year trend in mortality rates from 1996-2000 is decreasing with an annual

percent change (APC) of -11.6 percent. This indicates that lesions are being diagnosed and removed early. The South Dakota mortality rate is below the Healthy People 2010 objective.

Risk and Associated Factors

Fair skin or complexion, history of sunburns and/or exposure to ultraviolet light (both sun and artificial UV light), and multiple dark moles are the highest risk factors. A history of 3 or more sunburns, particularly blistering sunburns, from either sun exposure or tanning booths before age 20, greatly increases risk. Individuals with a prior history or family history of melanoma are also at risk. Immuno-suppressed persons also have increased risk.

Early Detection and Prevention

The best way to identify early melanoma is through the recognition of changes in skin growth such as moles or appearance of new growths. Skin examinations should be part of regular checkups and people at risk should be using the ABCD rule.

ABCD Rule

Asymmetry-one half of the mole does not match the other;

Border irregularity-edges are ragged or notched;

Color pigmentation not uniform; and

Diameter more than 6 millimeter

The best way to prevent melanoma is to protect the skin from sun exposure:

- Seek shade between 10:00 A.M. to 4:00 P.M. when the ultraviolet rays are the most intense, especially when your shadow is shorter than you are tall.
- Wear light-colored, tightly-woven, protective clothing, and wide-brimmed hats. Avoid tanning booths.

- Apply sunscreens with a Sun Protection Factor (SPF) of at least 15.

Children under 6 months of age should not have prolonged sun exposure, but if this occurs then a sunscreen should be used. Severe sunburns in childhood and adolescence may actually double the risk of melanoma in adulthood. Ultraviolet Rays A and B (UVA and UVB) are responsible for the burns. It is estimated that 80 percent of lifetime sun exposure occurs before age 18, therefore, use of sun protection should start as early as in childhood.

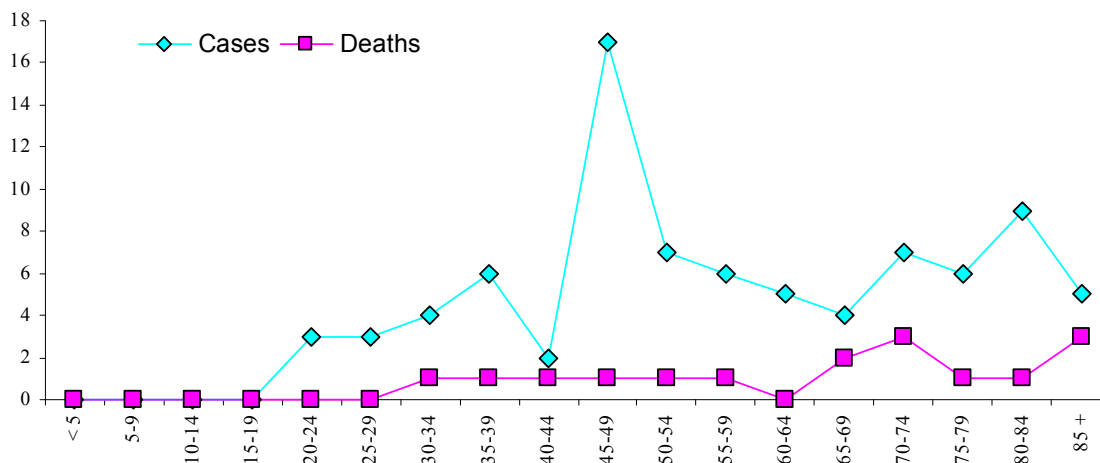
In the 2000 BRFSS survey, 33.3 percent of respondents said that they never use sun-block; 9.8 percent never stay in the shade; 39.1 percent never wear a hat; and 57.1 percent never wear long sleeves. Thirty five

percent always use at least one protective measure that may reduce the risk of skin cancer.¹⁷

The American Cancer Society estimated 200 new cases of invasive melanoma in 2000. The SDCR received only 67 reports. Only one third of the estimated melanomas in South Dakota for 2000 were reported to the central registry because case finding in 2000 has been predominantly from ACoS approved hospitals and most melanoma cases are now seen in doctors' offices instead of in a traditional hospital setting. Since South Dakota does not have a law requiring cancer reporting from physicians, the SDCR is using pathology reports to fill the gaps in case finding, therefore, more cases will be reported in 2001. Unknown stage of diagnosis will be less as the registry improves data collection of melanomas.

Healthy People 2010 Objective: 3-9 Increase the proportion of persons who use at least one of the following protective measures that may reduce the risk of skin cancer: avoid the sun between 10 AM and 4 PM, wear sun protective clothing when exposed to sunlight, use sunscreen with a sun protective factor (SPF) of 15 or higher, and avoid artificial sources of ultraviolet light.

Figure 27: Melanoma (Skin) cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

¹⁷ South Dakota 2000 BRFSS

MYELOMA[§]

South Dakota 2000

Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	34	15	19
No. of new <i>in situ</i> cases	0	0	0
South Dakota incidence ⁺	4.2	4.1	4.4
United States incidence*	5.5	6.8	4.5
Number of deaths	41	21	20
South Dakota mortality ⁺	4.7	6.0	3.9
United States mortality*	3.8	4.7	3.3

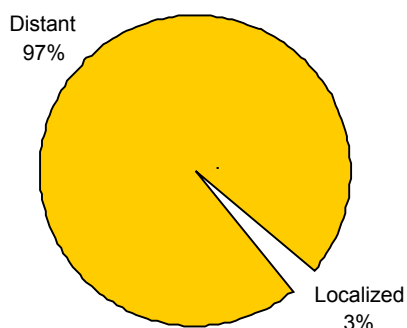
[§] includes NOS, multiple, plasma cell and solitary

Rates are per 100,000 persons

⁺ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Myeloma



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Myeloma is a malignancy of plasma cells and can proliferate throughout the body. Plasma cell disorders are somewhat uncommon. Myeloma accounts for approximately 1 percent of cancers in both South Dakota and the United States. It is rare in persons under 50 years old. It affects males more than females and in South Dakota. Whites are afflicted more than minorities. As expected most of the cases reported were at distant stage.

Mortality: Myeloma was the eleventh cause of cancer deaths and accounted for 2.2 percent of deaths. The survival rate is 31.5 percent for males and 28.8 percent for females (SEER). The South Dakota male mortality rate has been consistently higher than females and as compared to the national rates.

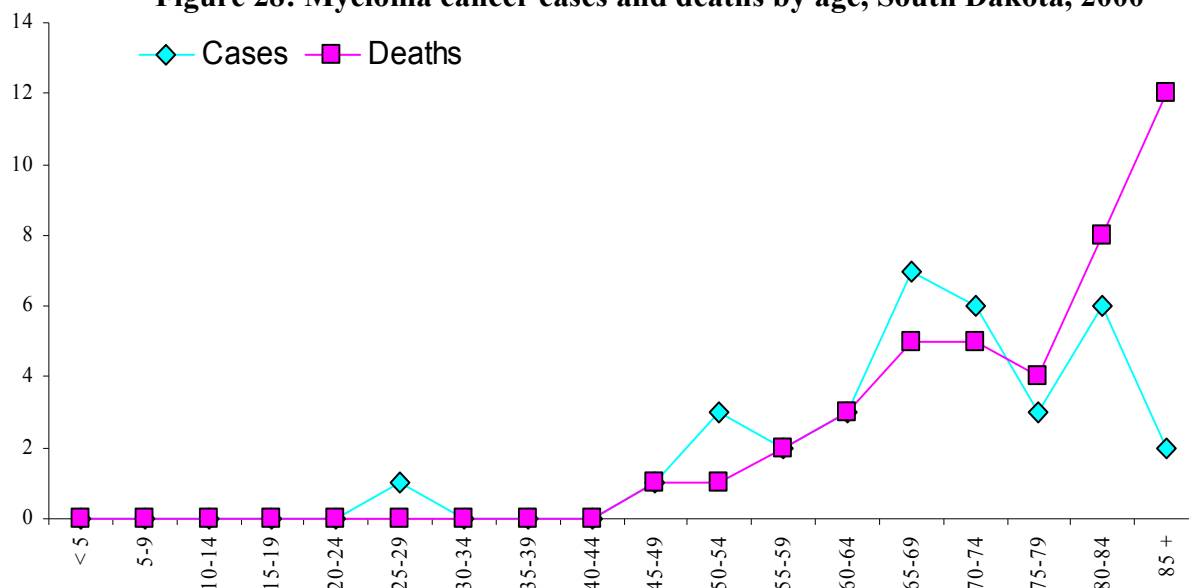
Risk and Associated Factors

The etiology of this cancer is relatively unknown. There is little evidence of the role of exposure to toxic substances, and ionizing radiation. Some viruses are thought to be associated with myelomas. There could also be a possible familial role and auto-immune conditions and chronic immune stimulation may increase risk.

Early Detection/Prevention

There is no known test for early detection. It is very difficult to diagnose. The presence of plasma cells and proteinuria do not automatically lead to myeloma. It is often asymptomatic in its early stage. Diagnosis involves the presence of M protein in serum and urine, and 30 percent plasma cells in the bone marrow. Estimating tumor burden is critical in staging and determining if multiple myeloma is present.

Figure 28: Myeloma cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 28: Myeloma age-adjusted mortality rates by race and gender, South Dakota and U.S., 2000 and 1996-2000

		2000			1996-2000		
		Total	White	American Indian	Total	White	American Indian
South Dakota +	TOTAL	11.1▲	11.5▲	0.0	9.9▲	10.0▲	5.1
	Male	11.2▲	14.9▲	0.0	12.3▲	12.6▲	4.2
	Female	8.5	8.6	0.0	7.9	8.0	5.5
United States *	TOTAL	8.2	8.6	5.8	8.6	8.9	4.9
	Male	10.3	10.7	6.6	10.7	11.1	5.9
	Female	6.7	7.0	5.2	7.0	7.3	4.2

Note: ▲ Significantly higher than the national rate. Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

NON-HODGKIN LYMPHOMA South Dakota 2000

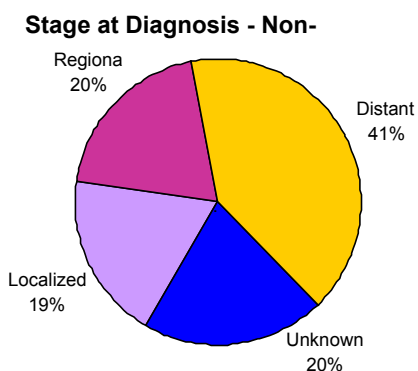
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	137	83	54
No. of new <i>in situ</i> cases	0	0	0
South Dakota incidence ⁺	17.1	22.9	11.9
United States Incidence*	19.0	23.4	15.4
Number of deaths	94	51	43
South Dakota mortality ⁺	11.1	14.2	8.5
United States mortality*	8.2	10.3	6.7

Rates are per 100,000 persons

⁺ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Lymphomas are malignancies of white blood cells and are typed either Hodgkin's or the more common non-Hodgkin's lymphoma (NHL). Eighty seven percent of the lymphomas reported to the SDCR in 2000 were NHL. It was the sixth leading cancer reported to the SDCR with 4.6 percent of new cases. There is a steep rise in cases as the population ages and more than half of the cases reported to the SDCR were in advanced stages. The ACS estimated 200 new cases of NHL for South Dakota in 2000. Many cases might be diagnosed and treated in physician's offices therefore they will not be reported to the SDCR.

The SDCR is actively looking to improve case ascertainment by using pathology reports and follow-back of cases found.

Mortality: NHL was the fifth leading cause of death by cancer with 5.3 percent of cancer deaths. Age-adjusted mortality rates for the total population, total white and for white males in South Dakota are significantly higher compared to national rates. In South Dakota, whites have significantly higher mortality rates than American Indians for 2000 and for the period 1996-2000. American Indians in South Dakota have the same rates as American Indians nationally. Lymphoma deaths have increased from 60 deaths in 1996 to 94 deaths in 2000. In South Dakota, whites have significantly higher mortality rates than American Indians for the period 1996-2000. The five-year trend in rate changes in mortality shows a positive annual percent change (APC) of 6.1 percent. Since there were no American Indian deaths due to non-Hodgkin lymphoma in 2000 in South Dakota, the increasing trend is due to a disparate increase in this cancer burden on the white population. This increase is also occurring nationally.

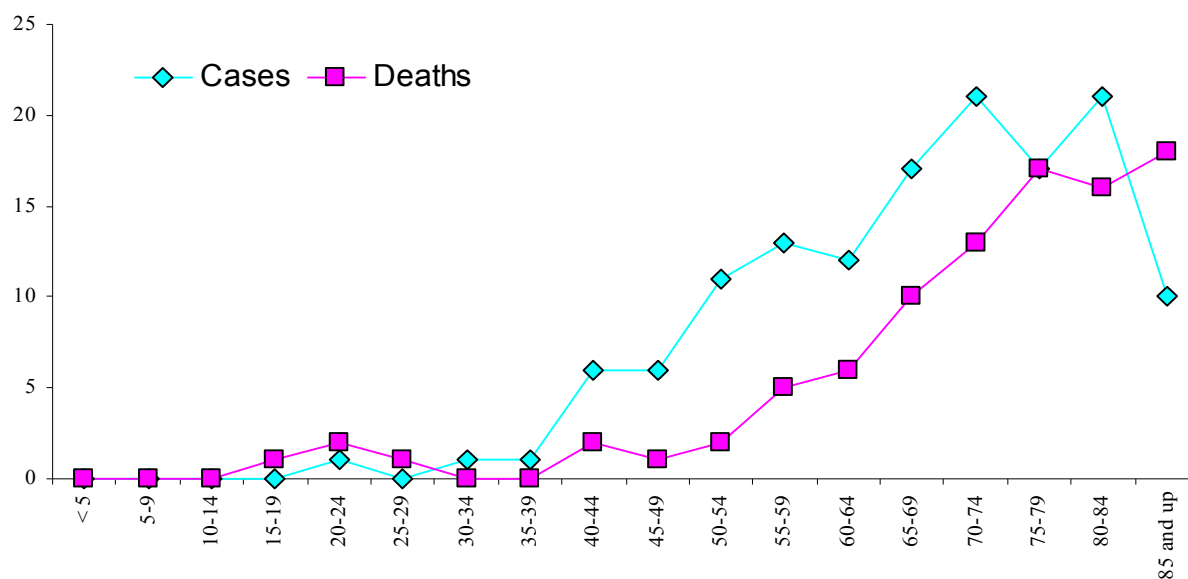
Risk and Associated Factors

There are no known risk factors. Immuno-suppressants increase the risk of NHL. HIV and other viruses, exposures to ethylene oxide and other chemicals in solvents, and pesticides or fertilizers are associated risk factors.

Early Detection/Prevention

There are no established tests to detect NHL early on a wide scale. It is usually diagnosed after patients present with signs and symptoms referable to lymphadenopathy.

Figure 29: Non-Hodgkin lymphoma cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 29: Non-Hodgkin lymphoma age-adjusted rates by race and gender, South Dakota and U.S., 2000 and 1996-2000

		2000			1996-2000		
		Total	White	American Indian	Total	White	American Indian
South Dakota +	TOTAL	11.1▲	11.5▲	0.0	9.9▲	10.0▲	5.1
	Male	11.2▲	14.9▲	0.0	12.3▲	12.6▲	4.2
	Female	8.5	8.6	0.0	7.9	8.0	5.5
United States *	TOTAL	8.2	8.6	5.8	8.6	8.9	4.9
	Male	10.3	10.7	6.6	10.7	11.1	5.9
	Female	6.7	7.0	5.2	7.0	7.3	4.2

Note: ▲ Significantly higher than the national rate. Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

ORAL CAVITY AND PHARYNX South Dakota 2000

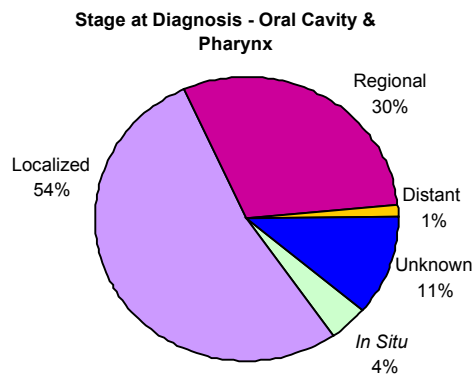
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	67	49	18
No. of new <i>in situ</i> cases	3	2	1
South Dakota incidence ⁺	8.7	13.6	4.2
United States incidence*	10.6	15.9	6.2
Number of deaths	23	11	12
South Dakota mortality ⁺	2.8	3.1	2.8
United States mortality*	2.7	4.1	1.6
Healthy People 2010 Objective	2.7		

Rates are per 100,000 persons

+ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Oral and pharyngeal cancers comprise a variety of malignant tumors and are overwhelmingly squamous cell carcinomas. Oral cavity and pharynx cancers were the tenth most common cancer reported to the SDCR accounting for 2.3 percent of cancer reported. Age plays a definite role in this cancer as the peak age for diagnosis is 50 to 74 years. Males have higher incidence and mortality rates. Rates among American Indians are twice as high as those for whites in South Dakota and when compared to all races nationally. This might be a reflection of high tobacco use among native peoples on the Northern Plains.

Mortality: Oral-pharyngeal cancer was the sixteenth cause of cancer deaths at 1.3 percent.

Mortality rates are not significant when compared to national rates. The annual percent change (APC) for the period 1992-1996 was -2.7 showing a decline in mortality. South Dakota has met the Healthy People 2010 goal of 2.7 for the same period with a rate of 2.6. However, looking at the American Indian rate, the disparity is clear. Reducing the American Indian mortality rate would help in reducing disparities and South Dakota's rate even lower and at the same time, reduce the overall cancer burden.

Risk and Associated Factors

Cigarette, cigar or pipe smoking and use of smokeless and spit tobacco along with excessive consumption of alcohol are major risk factors. Nearly 75 percent of cases are associated with tobacco use and combined exposure with alcohol substantially increases risk and accounts for 90 percent of cases. Diets low in fruits and vegetables are also associated with risk and rates are higher among minorities and lower income groups.

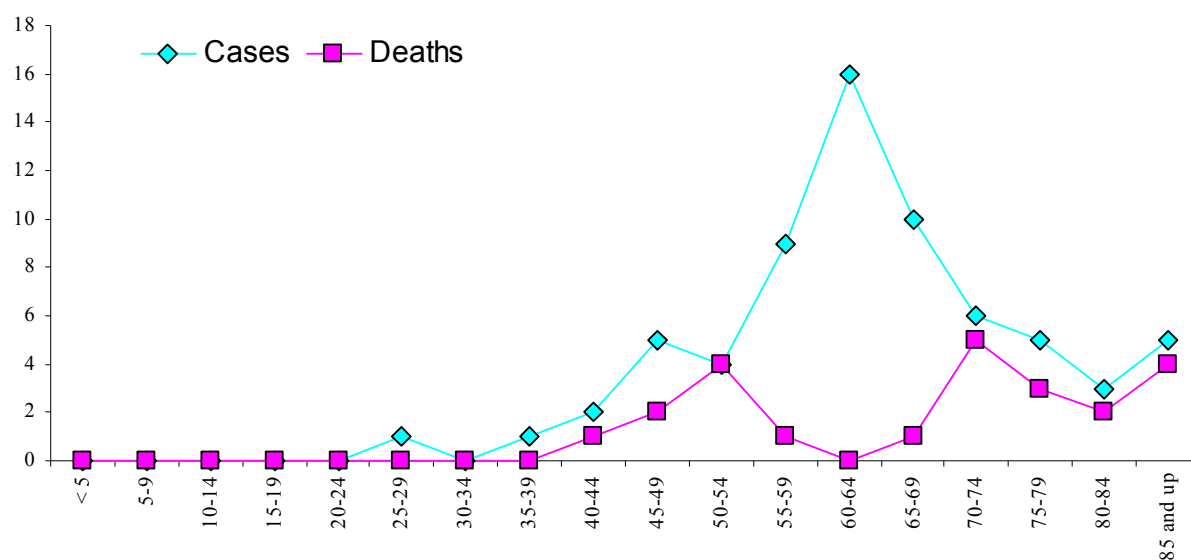
Early Detection and Prevention

The single most effective measure to lower risk of developing this cancer is to reduce exposure to tobacco and alcohol.

Most cases of oral cavity and pharynx cancers are preventable.

The Healthy People 2010 Objective 3-10 is to increase the proportion of physicians and dentists who counsel their at-risk patients about tobacco use cessation, physical activity, and cancer screening to 85 percent. This objective has not been addressed in the South Dakota BRFSS in the past. Efforts are being made to include appropriate questions in a statewide survey in the near future.

Figure 30: Oral cavity and pharynx cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 30: Oral cavity and pharynx age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	2.8	2.7	6.5	2.6	2.6	5.3
United States *	2.7	2.5	2.6	2.9	2.7	2.2

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

OVARY

South Dakota 2000

Incidence and Mortality Summary

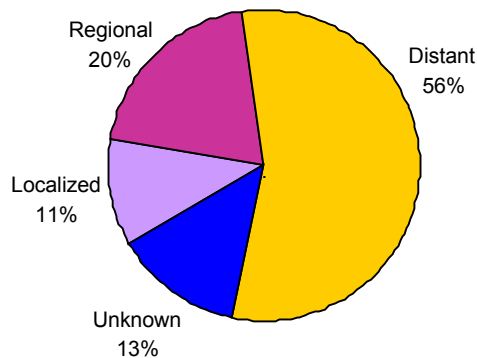
	Females
No. of new invasive cases	46
No. of new <i>in situ</i> cases	0
South Dakota incidence ⁺	10.6
United States incidence*	16.3
Number of deaths	42
South Dakota mortality ⁺	8.7
United States mortality*	8.9

Rates are per 100,000 persons

⁺ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Ovary



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Ovarian cancer ranked thirteenth with 1.5 percent of the cases reported to the central registry. If incidence reporting were complete, ovarian cancer would have a .91 death/case ratio which is extremely high and is a reflection of how many of these cancers are diagnosed at late stages. About 1 in every 57 women will get ovarian cancer. Most cases are women over the age of 50, but this disease can also affect younger women

Mortality: Ovarian cancer was the ninth leading cause of death by cancer in South Dakota in 2000 and accounted for 2.8 percent of cancer deaths and 81.3 at regional stage. The mortality rates for all sites and by race for 2000 and 1996-

2000 are not significantly different from the national rates. The five-year trend for mortality rates shows an increase during the period 1996-2000 with an annual percent change (APC) of 6.3 percent. American Indian women are more likely to die from ovarian cancer than white women. The five year survival at localized stage is 94.6 percent and 81.3 at regional stage. However at distant stage at which 56 percent of South Dakota's diagnoses was made, five year survival is only 30.9 percent.

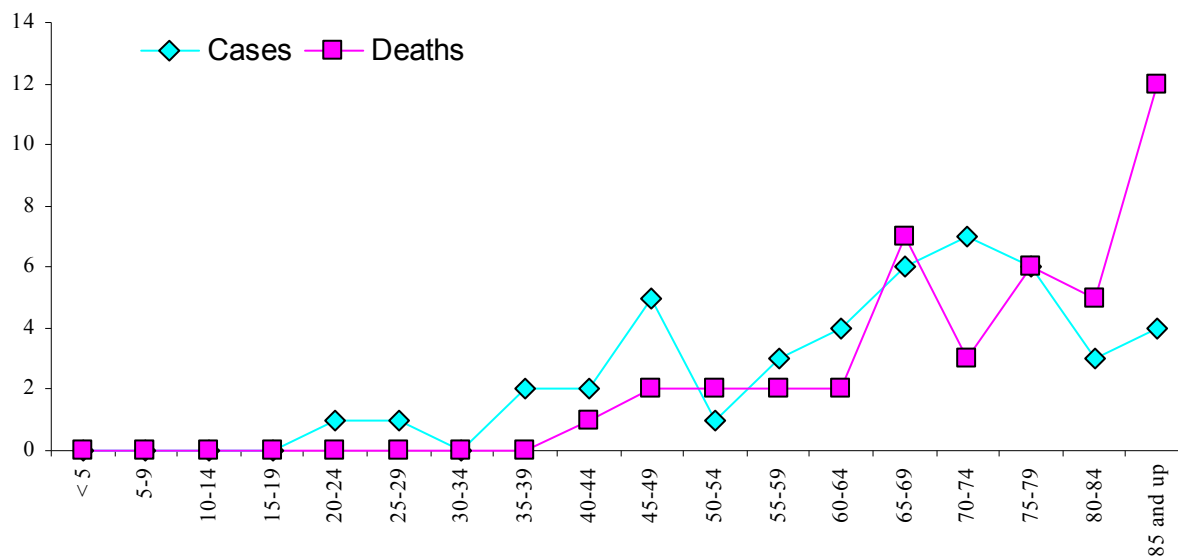
Risk and Associated Factors

Family history of a first degree relative with ovarian cancer is the most important risk factor. Fertility drugs, hormone replacement therapy, history of breast or colon cancer, no childbearing history and early menarche also increase risk.

Early Detection and Prevention

Ovarian cancer is hard to detect early. Many times, women with ovarian cancer have no symptoms or just mild symptoms until the disease is in an advanced stage. Scientists are studying ways to detect ovarian cancer before symptoms develop such as the usefulness of measuring the level of the tumor marker, CA 125 which is often found in higher-than-normal amounts in the blood of women with ovarian cancer and using transvaginal ultrasound.

Figure 31: Ovarian cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 31: Ovarian cancer age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	8.7	8.7	16.5	9.8	9.7	10.4
United States *	8.9	9.3	3.4	8.8	9.1	4.5

Note: Rates are per 100,000 persons, age-adjusted to 2000

U.S. standard population.

Source: + South Dakota Department of Health;

* SEER Cancer Statistics Review 1975-2000

PANCREAS

South Dakota 2000

Incidence and Mortality Summary

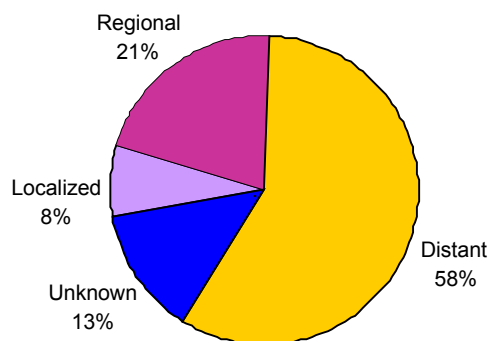
	Total	Males	Females
No. of new invasive cases	53	30	23
No. of new <i>in situ</i> cases	0	0	0
South Dakota incidence ⁺	6.6	8.3	5.0
United States incidence*	10.9	12.8	9.4
Number of deaths	82	42	40
South Dakota mortality ⁺	9.8	11.6	8.0
United States mortality*	10.6	12.2	9.3

Rates are per 100,000 persons

+ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Pancreas



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: In 2000 there were 53 cases of pancreatic cancers reported accounting for 1.8 percent of reported cancer cases. Incidence in South Dakota might be under reported because many pancreatic cancers are diagnosed clinically and not treated. Rates increase with age and pancreatic cancer is rare below 40 years of age. Males have higher rates than females. Many of them are diagnosed at regional and distant stages. More than half of the cases reported were at distant stage.

Mortality: Pancreatic cancer is responsible for nearly 21 percent of all deaths due to cancer of the digestive system. It was the sixth leading

cause of cancer deaths with 82 deaths and 5.2 percent of cancer deaths. Even though the

South Dakota age-adjusted mortality rates for 2000 and 1996-2000 were not significantly different from the US rate, the five year trend in mortality rate changes showed an increase in mortality with an annual percent change (APC) of 2.8 percent. Over the five year period 1995-2000, the mortality rate for American Indians is slightly higher than those for whites in South Dakota, while nationally rates for whites are much higher than for American Indians. This cancer normally has a high death/case ratio as many of them are diagnosed at regional and distant stages. The five-year survival rate is only 5 percent. There is no Healthy People 2010 objective for this cancer.

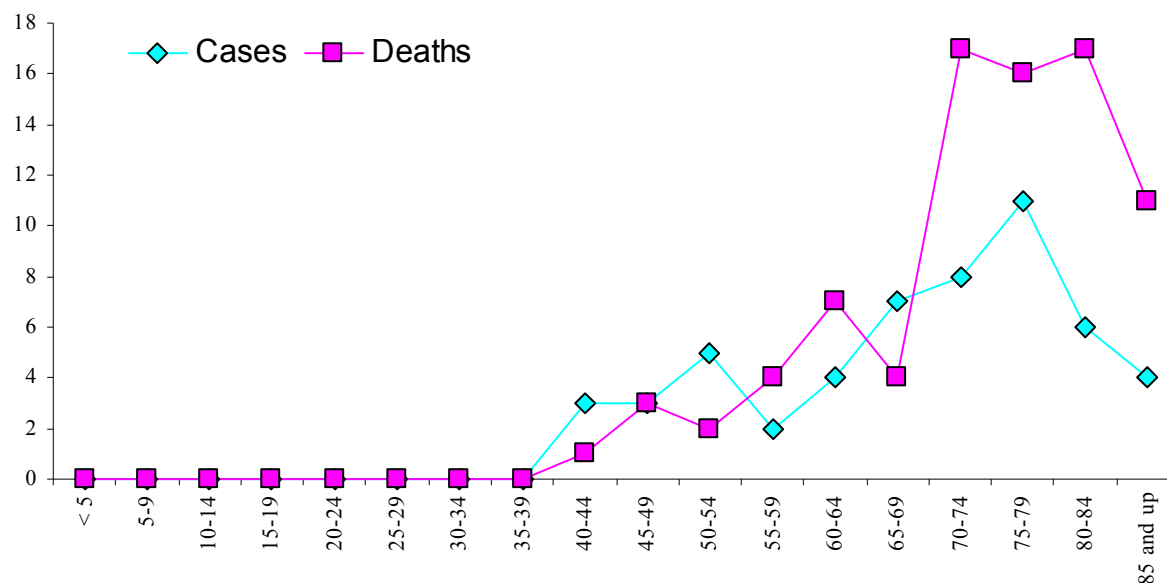
Risks and Associated Factors

High dietary fat intake, exposures in industries involving the manufacture of benzene and beta-naphthalene and metal and leather works are associated with increased risk. Pancreatic cancer is more common in smokers than non-smokers.

Early Detection and Prevention

At present there are no screening tests that can accurately detect early stage pancreatic cancer in asymptomatic individuals. The only chance for cure is surgical resection and only 10 to 25 percent of patients can undergo surgery.

Figure 32: Pancreatic cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Table 32: Pancreatic cancer age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	9.8	9.5	15.4	10.0	9.9	11.7
United States *	10.6	10.4	6.0	10.5	10.3	6.6

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

PROSTATE South Dakota 2000

Incidence and Mortality Summary

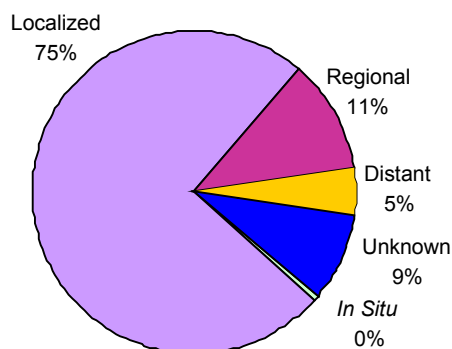
	Males
No. of new invasive cases	418
No. of new <i>in situ</i> cases	2
South Dakota incidence+	115.3
United States incidence*	176.9
Number of deaths	101
South Dakota mortality+	29.3
United States mortality*	30.6
Health People 2010 Objective	28.8

Rates are per 100,000 persons

+ Source: South Dakota Department of Health

- SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis - Prostate



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Prostate cancer is the most common form of cancer diagnosed (other than skin cancer) in males. It is primarily a disease of older men. It was the second leading cancer reported to the SDCR with 418 new cases or 13.9 percent in 2000. South Dakota should expect increasing incidence as the population ages and as more men get tested. Only 2 *in situ* cases were reported but 75 percent were diagnosed at the localized stage and 11 and 5 percent at regional and distant stages, respectively. The American Cancer Society estimated 600 new cases of prostate cancer for South Dakota in 2000.

Mortality: Prostate cancer is the second leading cause of cancer death in males. It was the fourth cause of death by cancer with 6.9 percent of all deaths reported. South Dakota like the U.S. as a whole is close to the Healthy People 2010 target. Mortality rates by race show whites and American Indians with comparable rates. Overall, rates have decreased over the five year period 1996-2000 with an annual percent change (APC) of -4.6 percent. Mortality rates are similar for the total, white and American Indian populations.

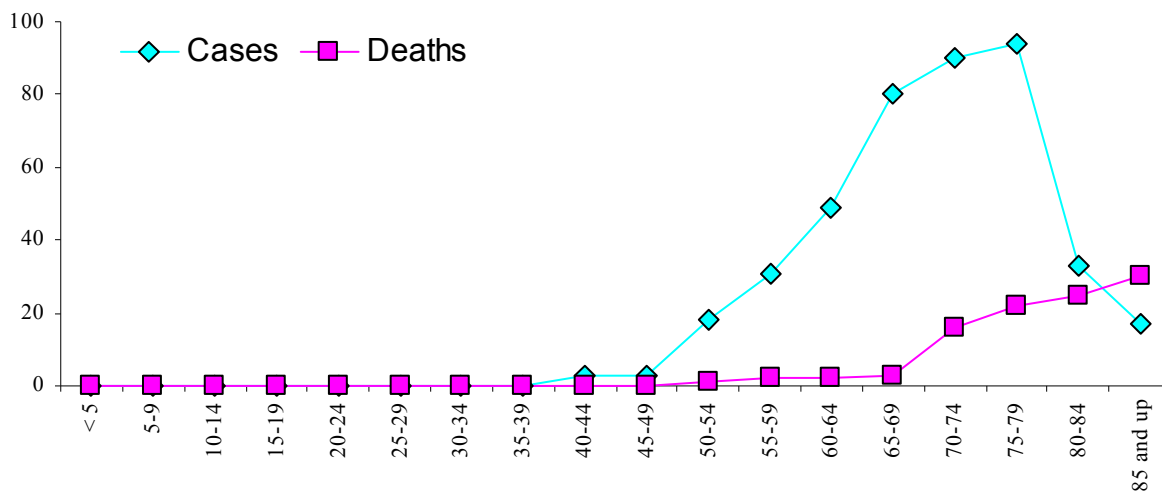
Risks and Associated Factors

Family history has been implicated as increased risk for prostate cancer, but it is unknown whether it is because of genetics or the same exposure. Fat consumption is associated with prostate cancer and occupational exposure such as cadmium may increase risk.

Early Detection and Prevention

Increasing levels of prostate specific antigen in the blood indicate the presence of prostate cancer. However, even with widespread use of this test, prostate cancer mortality has not decreased as the test cannot distinguish between slow growing tumors that are not life threatening and aggressive tumors. The American Cancer Society recommends that men 50 years and older should discuss the risks and benefits of screening with their physician. Digital rectal examinations (DRE) and the Prostate specific antigen (PSA) are essential components of diagnosing prostate cancer. There are numerous treatment options including surgery, radiation, hormonal and chemotherapy. Eighty-three percent of prostate cancers are diagnosed in the local and regional stages. It should be noted that the five-year survival rate for patients diagnosed at these early stages is 100 percent. The survival rate for all stages combined has increased from 67 to 96 percent over the last 20 years in the U.S.

Figure 33: Prostate cancer cases and deaths by age, South Dakota 2000



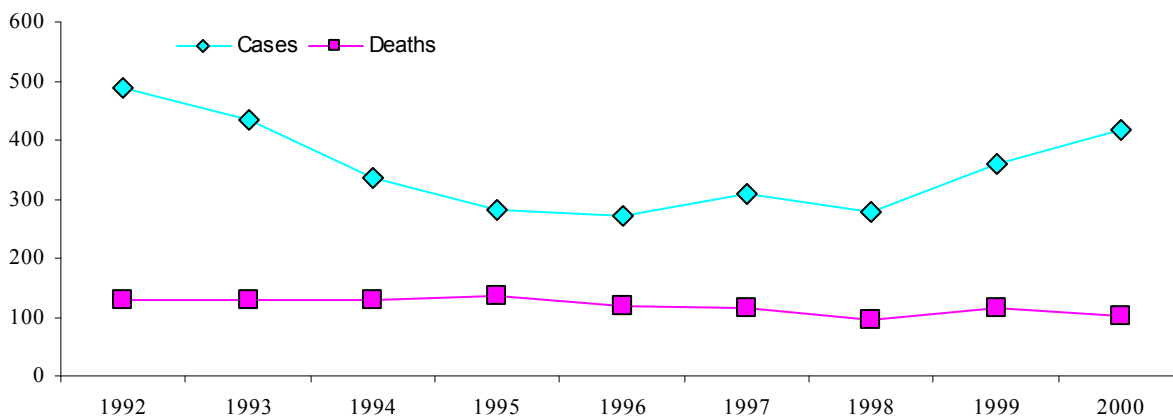
Source: South Dakota Department of Health

Table 33: Prostate cancer age-adjusted mortality rates by race, South Dakota and U.S., 2000 and 1996-2000

	2000			1996-2000		
	Total	White	American Indian	Total	White	American Indian
South Dakota +	29.3	29.1	28.9	32.3	30.6	32.0
United States *	30.6	27.9	20.1	32.9	30.2	21.9

Note: Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.
Source: + South Dakota Department of Health; * *SEER Cancer Statistics Review 1975-2000*

Figure 34: Prostate cancer cases and deaths, South Dakota, 1992-2000



Source: South Dakota Department of Health

STOMACH

South Dakota 2000

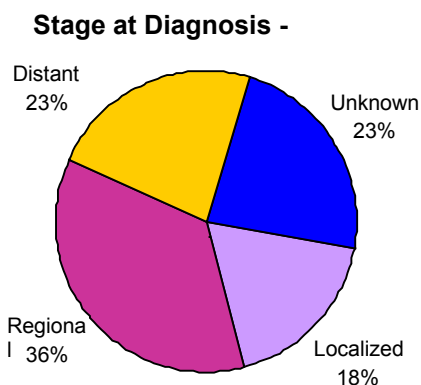
Incidence and Mortality Summary

	Total	Males	Females
No. of new invasive cases	39	26	13
No. of new <i>in situ</i> cases	0	0	0
South Dakota incidence ⁺	4.8	7.4	2.8
United States incidence*	8.0	11.6	5.3
Number of deaths	29	16	13
South Dakota mortality ⁺	3.4	4.6	2.6
United States mortality*	4.6	6.4	3.2

Rates are per 100,000 persons

⁺ Source: South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Stomach cancer accounted for 1.3 percent of cancers reported to the SDCR. Approximately 60 percent of the incident cases were diagnosed at the regional or distant stage. Incidence increases with age with more males than females being afflicted.

Mortality: Stomach cancer accounted for 2.0 percent of cancer deaths in 2000 in South Dakota. American Indians had rates significantly higher than other South Dakotans and their male rates were four times the female rate for 2000. However during the period 1996-2000, rates for American Indians were higher than others but were not significant. Overall the five year rate changes in mortality, 1996-2000, show a decreasing trend with an APC of -3.5 percent for stomach cancers in

South Dakota. Gastric cancer is presently eighth in cancer deaths in the U.S. and first in the world. It used to be the number one cause of cancer deaths in the U.S. in the 1930's and probably decreased because of improved methods of food preservation such as refrigeration. It remains high in countries far from the equator.

Risk and Associated Factors

Increased risk has been associated with diets high in smoked foods and foods high in nitrates. Higher rates are found among coal miners and asbestos workers. Cigarette smoking is associated with higher rates and infection with *Helicobacter pylori*, polyps and chronic gastritis can increase risk of disease. Persons who have lived their early years in countries such as Japan, where incidence rates are very high, maintain the same risks after immigrating to the U.S. However, their offspring have the same risk as whites in the U.S., indicating that exposure to the risk factors could be early in life.

Figure 35: Stomach cancer cases and deaths by age, South Dakota, 2000

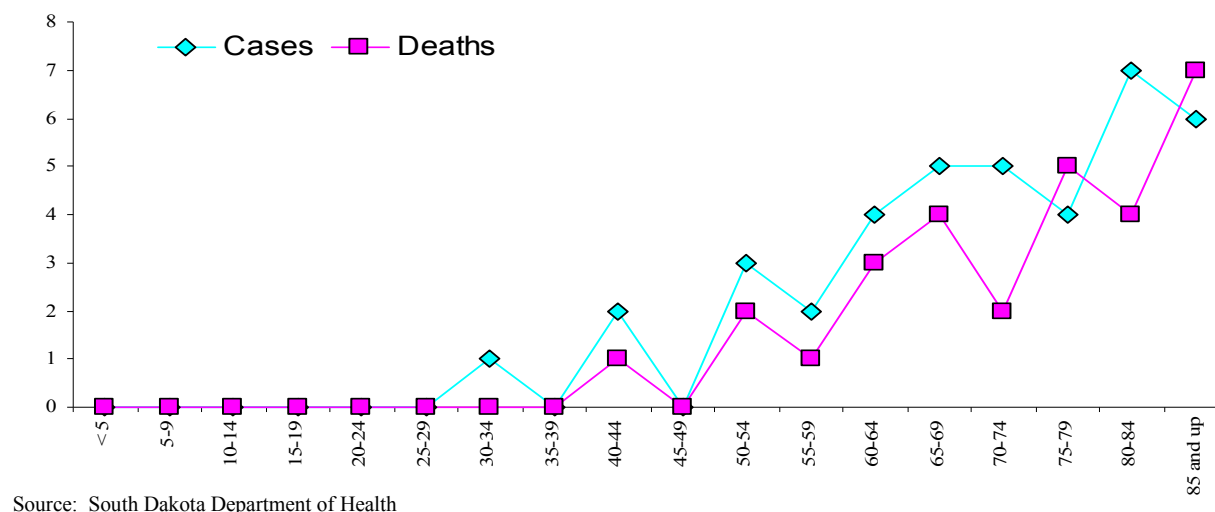


Table 34: Stomach age-adjusted mortality rates by race and gender, South Dakota and U.S., 2000 and 1996-2000

		2000			1996-2000		
		Total	White	American Indian	Total	White	American Indian
South Dakota +	TOTAL	3.4	3.0	12.1 ▲	3.8	3.6	6.1
	Male	3.5	3.9	20.3 ▲	4.8	4.7	5.1
	Female	2.6	2.4	5.1	3.0	2.7	7.0
United States *	TOTAL	4.6	4.0	5.1	4.8	4.2	5.4
	Male	6.4	5.7	6.6	6.9	6.1	7.0
	Female	3.2	2.8	4.0	3.4	2.9	4.2

Note: ▲ Significantly higher than the national rate. Rates are per 100,000 persons, age-adjusted to 2000 U.S. standard population.

Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

THYROID

South Dakota 2000

Incidence and Mortality Summary

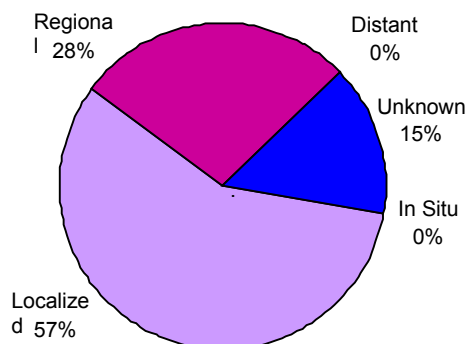
	Total	Males	Females
No. of new invasive cases	40	12	28
No. of new <i>in situ</i> cases	0	0	0
South Dakota incidence ⁺	5.3	3.3	7.3
United States incidence*	7.4	4.0	10.8
Number of deaths	5	3	2
South Dakota mortality ⁺	0.6	0.8	0.4
United States mortality*	0.5	0.6	0.4

Rates are per 100,000 persons

Source: + South Dakota Department of Health

* SEER Cancer Statistics Review 1975-2000

Stage at Diagnosis -



Source: South Dakota Department of Health

Descriptive Epidemiology

Incidence: Thyroid cancers were 1.3 percent of cases reported to the SDCR. Thyroid cancers occur in people of all ages and occur more often in men than in women.

Mortality: It accounted for 0.3 percent of cancer deaths. The five year survival rate is over 95 percent and most of the cancers are diagnosed when localized. U.S. and SD mortality rates are similar. Total and female American Indian rates in 2000 are significantly higher than national rate.

Risk and Associated Factors

High levels of radiation, exposure in childhood; family history and not enough iodine in the diet increase risk.

Early Detection and Prevention

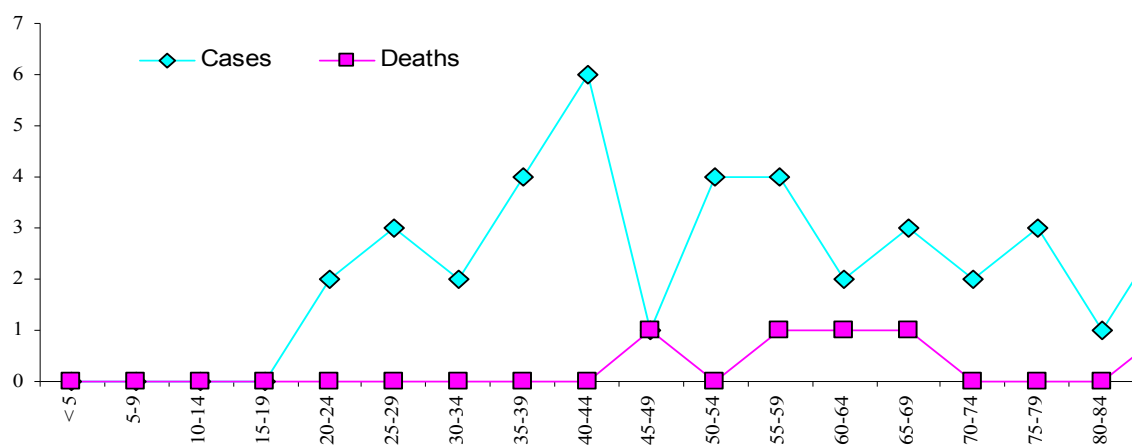
Cancer of the thyroid is extremely rare, accounting for less than one percent of all cancers diagnosed. Early detection is an important factor for successful treatment. There are no tests for early detection but people with symptoms should seek prompt attention. Symptoms can include: a lump on the side for the neck hoarseness of the voice and difficulty swallowing. Most cancerous thyroid tumors are slow-growing and non- fatal.

Table 35: Thyroid age-adjusted mortality rates by race and gender, South Dakota and U.S., 2000 and 1996-2000

		2000			1996-2000		
		Total	White	Native American	Total	White	Native American
South Dakota +	TOTAL	0.6	0.4	3.1 ▲	0.5	0.5	0.6
	Male	0.8	0.6	0.0	0.6	0.5	0.0
	Female	0.4	0.1	5.5 ▲	0.4	0.4	1.1 ▲
United States *	TOTAL	0.5	0.5	0.3	0.5	0.5	0.3
	Male	0.4	0.4	0.1	0.4	0.4	0.1
	Female	0.5	0.5	0.4	0.5	0.5	0.4

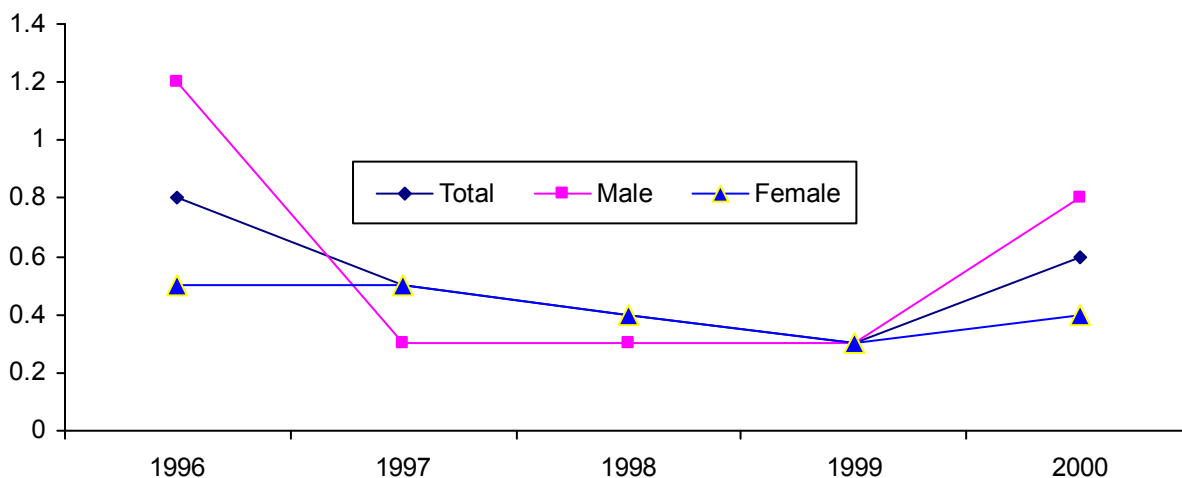
Note: ▲ Significantly higher than the national rate. Rates are age-adjusted per 100,000 population using U.S. standard million.
Source: + South Dakota Department of Health; * SEER Cancer Statistics Review 1975-2000

Figure 36: Thyroid cancer cases and deaths by age, South Dakota, 2000



Source: South Dakota Department of Health

Figure 37: Thyroid cancer age-adjusted mortality rates by gender, South Dakota, 1996-2000



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SECTION IV

***CHILDHOOD CANCERS
CAUSES AND PREVENTION***

CHILDHOOD CANCERS

South Dakota 2000

In this section, each major group of childhood cancers found is presented with the observed new cases and deaths during 2000 in South Dakota. Childhood cancers refer to cancer in South Dakota children from birth to less than 20 years of age.

Descriptive Epidemiology

Leukemia is the most common form of childhood cancer and accounts for one fourth of all cancers. Brain cancer accounts for approximately 20 percent and lymphomas are 12 percent. Others may be Wilm's tumor, retinoblastoma and malignant bone tumors. Each primary malignancy is counted as a separate cancer when calculating incidence rates, thus the total number of cancers can be greater than the total number of affected children. The increased risk of a second primary cancer persists into adulthood.

Risk and Associated Factors

Many causes of childhood cancers are unknown. However, genetic factors and certain prenatal and postnatal exposures can increase the risk of developing some childhood cancers. Children who have been treated for one primary cancer are at an increased risk of a second primary cancer later in life, i.e. a second primary cancer, which is unrelated to the first cancer and not a result of the first cancer spreading or returning. Radiation and chemotherapies may increase the risk of subsequent primary cancers. Close monitoring of children for additional cancers is recommended after initial treatment for cancer.

Early Detection and Prevention

There are no screening programs and like other childhood diseases, cancer is difficult to diagnose. Any sudden unexplained symptoms of any kind should be brought to the attention of a physician.

Table 36: Childhood cancer cases by site, South Dakota 2000

Site	Total	Male	Female
Total Cases	19	5	14
Leukemia	8	3	5
Kidney	1	0	1
Meninges, Brain & Central Nervous Sys.	4	1	3
Non-Hodgkin lymphoma	1	0	1
All Other Causes	5	1	4

Source: South Dakota Department of Health

Table 37: Childhood cancer deaths by site, South Dakota 2000

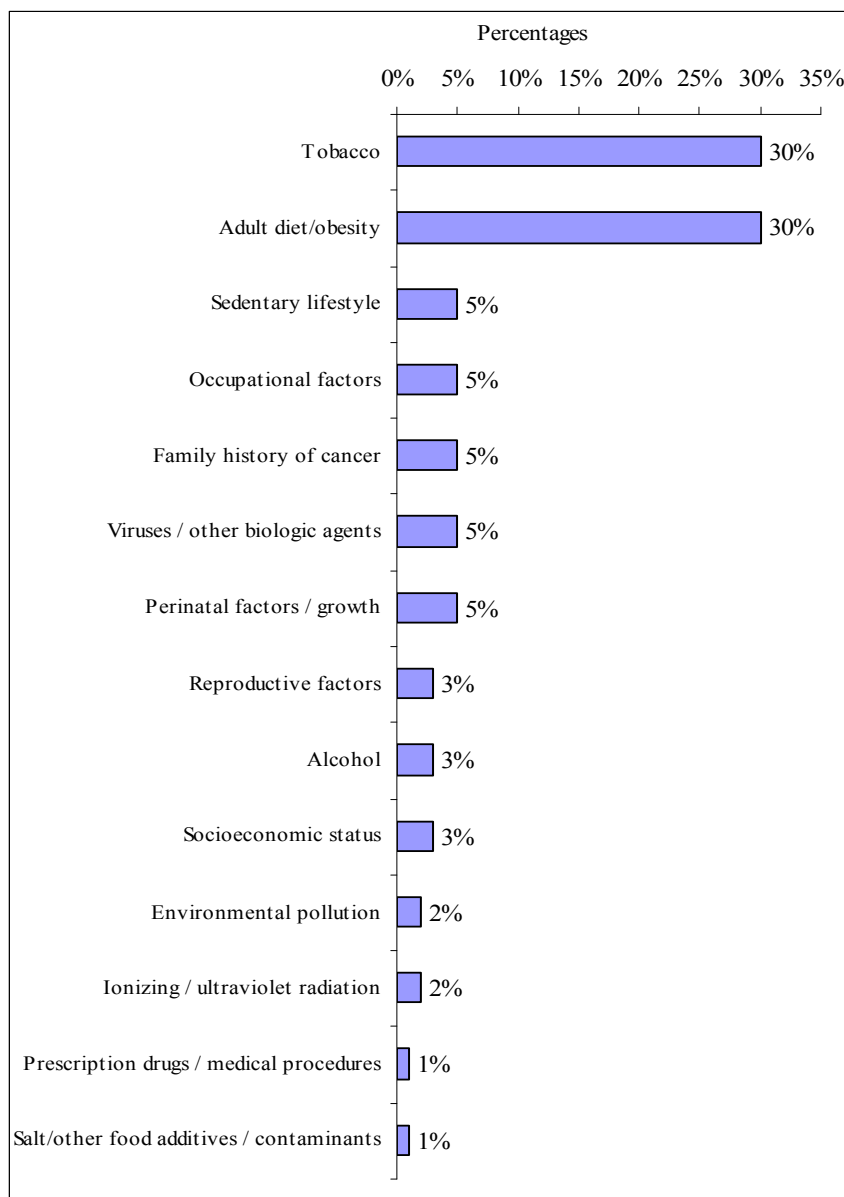
Site	Total	Male	Female
Total Deaths	3	3	0
Leukemia	1	1	0
Meninges, Brain & Central Nervous Sys.	1	1	0
All Other Causes	1	1	0

Source South Dakota Department of Health

CANCER CAUSES AND PREVENTION

All cancers involve the malfunction of genes that control cell growth and division. Approximately 5 percent are clearly inheritance of a faulty gene and the remainder result from mutations that occur through our lifetime, either due to internal or external factors.

Figure 38: Causes of Cancer Deaths in the United States¹⁸



Cancers associated with smoking and the lack of physical activity are largely preventable. Regular screening can result in the early detection in the early stages of cancers such as breast, colon, rectum, cervix, prostate, testis, oral cavity and skin. Early detection at the localized stage will increase the five-year survival from 82 percent to 95 percent.

¹⁸ Harvard Center for Cancer Prevention. Harvard Report on Cancer Prevention Volume 1: Causes of Human Cancer, 1996:7 (S1): 7-15

APPENDICES

Appendix A : 2000 United States standard million population

Age Group	Number in Group
All ages	1,000,000
<5	69,135
5-9	72,533
10-14	73,032
15-19	72,169
20-24	66,478
25-29	64,529
30-34	71,044
35-39	80,762
40-44	81,851
45-49	72,118
50-54	62,716
55-59	48,454
60-64	38,793
65-69	34,264
70-74	31,773
75-79	26,999
80-84	17,842
85+	15,508

Appendix B: Race in South Dakota by county, 2000 Census*

	Total	White	Black	Native American	Asian	Native Hawaiian	Some Other
South Dakota	754844	669404 89%	6201 1%	68279 9%	5760 1%	361 0%	4839 1%
Aurora	3058	2926 96%	10 0%	65 2%	8 0%	0 0%	49 2%
Beadle	17023	16501 97%	156 1%	228 1%	68 0%	9 0%	61 0%
Bennett	3574	1462 41%	11 0%	2075 58%	3 0%	10 0%	13 0%
BonHomme	7260	6934 96%	59 1%	241 3%	8 0%	1 0%	17 0%
Brookings	28220	27194 96%	119 0%	343 1%	433 2%	11 0%	120 0%
Brown	35460	33854 95%	141 0%	1165 3%	177 0%	37 0%	86 0%
Brule	5364	4823 90%	17 0%	486 9%	33 1%	2 0%	3 0%
Buffalo	2032	332 16%	2 0%	1692 83%	0 0%	0 0%	6 0%
Butte	9094	8687 96%	14 0%	247 3%	30 0%	0 0%	116 1%
Campbell	1782	1770 99%	0 0%	11 1%	1 0%	0 0%	0 0%
CharlesMix	9350	6512 70%	14 0%	2754 29%	11 0%	1 0%	58 1%
Clark	4143	4087 99%	5 0%	31 1%	8 0%	2 0%	10 0%
Clay	13537	12560 93%	173 1%	457 3%	295 2%	3 0%	49 0%
Codington	25897	25054 97%	67 0%	498 2%	107 0%	6 0%	165 1%
Corson	4181	1555 37%	4 0%	2603 62%	5 0%	0 0%	14 0%
Custer	7275	6851 94%	30 0%	325 4%	32 0%	1 0%	36 0%
Davison	18741	18034 96%	80 0%	445 2%	101 1%	10 0%	71 0%
Day	6267	5719 91%	11 0%	514 8%	5 0%	3 0%	15 0%
Deuel	4498	4431 99%	5 0%	30 1%	15 0%	6 0%	11 0%
Dewey	5972	1442 24%	3 0%	4503 75%	9 0%	3 0%	12 0%
Douglas	3458	3391 98%	6 0%	50 1%	5 0%	0 0%	6 0%
Edmunds	4367	4332 99%	6 0%	13 0%	10 0%	1 0%	5 0%
Fall River	7453	6746 91%	29 0%	606 8%	26 0%	8 0%	38 1%
Faulk	2640	2626 99%	2 0%	10 0%	1 0%	0 0%	1 0%
Grant	7847	7738 99%	2 0%	47 1%	25 0%	0 0%	35 0%
Gregory	4792	4465 93%	2 0%	298 6%	18 0%	0 0%	9 0%
Haakon	2196	2117 96%	0 0%	74 3%	4 0%	0 0%	1 0%
Hamlin	5540	5456 98%	9 0%	49 1%	17 0%	1 0%	8 0%
Hand	3741	3715 99%	2 0%	11 0%	8 0%	0 0%	5 0%
Hanson	3139	3124 99%	0 0%	5 0%	8 0%	1 0%	1 0%
Harding	1353	1321 98%	4 0%	15 1%	8 1%	0 0%	5 0%
Hughes	16481	14654 89%	38 0%	1631 10%	85 1%	4 0%	69 0%
Hutchinson	8075	7980 99%	14 0%	64 1%	9 0%	0 0%	8 0%
Hyde	1671	1522 91%	4 0%	141 8%	0 0%	2 0%	2 0%
Jackson	2930	1467 50%	1 0%	1453 50%	4 0%	1 0%	4 0%
Jerauld	2295	2272 99%	2 0%	18 1%	3 0%	0 0%	0 0%
Jones	1193	1143 96%	0 0%	47 4%	0 0%	1 0%	2 0%
Kingsbury	5815	5730 99%	8 0%	33 1%	31 1%	0 0%	13 0%
Lake	11276	11023 98%	35 0%	99 1%	67 1%	1 0%	51 0%
Lawrence	21802	20884 96%	71 0%	629 3%	104 0%	14 0%	100 0%
Lincoln	24131	23539 98%	133 1%	204 1%	156 1%	9 0%	90 0%
Lyman	3895	2522 65%	3 0%	1351 35%	14 0%	0 0%	5 0%
Marshall	5832	5766 99%	5 0%	36 1%	15 0%	0 0%	10 0%
McCook	2904	2885 99%	0 0%	12 0%	5 0%	0 0%	2 0%
McPherson	4576	4237 93%	8 0%	312 7%	5 0%	3 0%	11 0%
Meade	24253	22471 93%	444 2%	829 3%	286 1%	19 0%	204 1%
Mellette	2083	932 45%	0 0%	1143 55%	2 0%	0 0%	6 0%
Miner	2884	2848 99%	18 1%	11 0%	4 0%	0 0%	3 0%
Minnehaha	148281	137941 93%	2916 2%	3457 2%	1895 1%	93 0%	1979 1%
Moody	6595	5600 85%	28 0%	909 14%	46 1%	1 0%	11 0%
Pennington	88565	76789 87%	1028 1%	8735 10%	1080 1%	72 0%	861 1%
Perkins	3363	3250 97%	9 0%	73 2%	9 0%	0 0%	22 1%
Potter	2693	2643 98%	0 0%	33 1%	13 0%	1 0%	3 0%
Roberts	10016	6840 68%	17 0%	3121 31%	33 0%	0 0%	5 0%
Sanborn	2675	2645 99%	3 0%	10 0%	13 0%	1 0%	3 0%
Shannon	12466	562 5%	10 0%	11850 95%	4 0%	6 0%	34 0%
Spink	7454	7272 98%	20 0%	133 2%	15 0%	1 0%	13 0%
Stanley	2772	2579 93%	8 0%	172 6%	9 0%	0 0%	4 0%
Sully	1556	1522 98%	3 0%	20 1%	5 0%	0 0%	6 0%
Todd	9050	1138 13%	8 0%	7861 87%	18 0%	0 0%	25 0%
Tripp	6430	5625 87%	10 0%	782 12%	7 0%	0 0%	6 0%
Turner	8849	8748 99%	23 0%	43 0%	24 0%	0 0%	11 0%
Union	12584	12187 97%	55 0%	87 1%	191 2%	7 0%	57 0%
Walworth	5974	5172 87%	7 0%	776 13%	11 0%	2 0%	6 0%
Yankton	21652	20592 95%	289 1%	469 2%	116 1%	7 0%	179 1%
Ziebach	2519	665 26%	0 0%	1844 73%	2 0%	0 0%	8 0%

*Multiple race categories collapsed into most common minority status.

Source: United States Census Bureau, 2000

Appendix C: American Indian population by age group and county, Census 2000

Age group	0-19	20-29	30-39	40-49	50+	Total
South Dakota	33,483	9,868	8,939	7,185	8,806	68,279
Aurora	57	2	1	1	4	65
Beadle	104	34	42	23	25	228
Bennett	1,046	296	268	203	262	2,075
Bon Homme	87	65	42	31	16	241
Brookings	167	67	52	30	27	343
Brown	540	197	167	114	147	1,165
Brule	339	36	39	27	45	486
Buffalo	832	223	211	184	242	1,692
Butte	115	30	40	28	34	247
Campbell	5	1	1	1	3	11
Charles Mix	1,379	398	301	304	372	2,754
Clark	22	-	5	3	1	31
Clay	213	107	57	31	49	457
Codington	236	86	74	66	36	498
Corson	1,285	369	353	256	340	2,603
Custer	170	33	19	46	58	325
Davison	241	77	58	40	30	445
Day	254	61	58	57	84	514
Deuel	12	5	2	6	5	30
Dewey	2,170	592	621	489	631	4,503
Douglas	30	2	5	8	5	50
Edmunds	7	-	1	1	4	13
Fall River	247	73	59	74	153	606
Faulk	4	-	1	3	2	10
Grant	24	6	5	8	4	47
Gregory	130	38	43	37	50	298
Haakon	41	10	13	5	5	74
Hamlin	19	11	6	5	8	49
Hand	3	-	4	-	4	11
Hanson	1	2	2	-	-	5
Harding	6	-	2	2	5	15
Hughes	851	241	220	152	167	1,631
Hutchinson	44	7	4	3	6	64
Hyde	57	26	21	18	19	141
Jackson	750	183	182	140	198	1,453
Jerauld	8	3	1	2	4	18
Jones	19	8	6	5	9	47
Kingsbury	12	3	6	5	7	33
Lake	49	10	22	12	6	99
Lawrence	298	108	62	67	94	629
Lincoln	110	25	25	27	17	204
Lyman	689	200	165	144	153	1,351
McCook	5	4	-	1	2	12
McPherson	142	32	42	31	65	312
Marshall	14	4	8	6	4	36
Meade	380	112	90	112	135	829
Mellette	565	126	150	122	180	1,143
Miner	4	-	1	3	3	11
Minnehaha	1,536	674	608	376	263	3,457
Moody	421	126	139	99	124	909
Pennington	4,057	1,402	1,201	966	1,109	8,735
Perkins	37	6	11	5	14	73
Potter	12	2	6	3	10	33
Roberts	1,521	420	395	321	464	3,121
Sanborn	5	1	2	-	2	10
Shannon	5,969	1,618	1,524	1,195	1,544	11,850
Spink	46	30	31	16	10	133
Stanley	89	14	24	22	23	172
Sully	10	2	2	3	3	20
Todd	4,016	1,099	946	818	982	7,861
Tripp	419	85	104	70	104	782
Turner	21	5	5	7	5	43
Union	41	9	13	12	12	87
Walworth	365	129	96	68	118	776
Yankton	170	83	70	71	75	469
Ziebach	965	250	205	200	224	1,844

Source: United States Census Bureau, 2000

Appendix D: SEER incidence site analysis categories

Site Group	ICD-O-2 Site excludes histological type 9590-9989
Oral Cavity and Pharynx	
Lip	C000-C009
Tongue	C019-C029
Salivary Gland	C079-C089
Floor of Mouth	C040-C049
Gum and Other Mouth	C030-C039, C050-C059, C060-C069
Nasopharynx	C110-C119
Tonsil	C090-C099
Oropharynx	C100-C109
Hypopharynx	C129, C130-C139
Other Oral Cavity and Pharynx	C140, C142-C148
Digestive System	
Esophagus	C150-C159
Stomach	C160-C169
Small Intestine	C170-C179
Colon and Rectum	
Colon excluding Rectum	
Cecum	C180
Appendix	C181
Ascending Colon	C182
Hepatic Flexure	C183
Transverse Colon	C184
Splenic Flexure	C185
Descending Colon	C186
Sigmoid Colon	C187
Large Intestine, NOS	C188-C189, C260
Rectum and Rectosigmoid Junction	
Rectosigmoid Junction	C199
Rectum	C209
Anus, Anal Canal and Anorectum	C210-C212, C218
Liver and Intrahepatic Bile Duct	
Liver	C220
Intrahepatic Bile Duct	C221
Gallbladder	C239
Other Biliary	C240-C249
Pancreas	C250-C259
Retroperitoneum	C480
Peritoneum, Omentum and Mesentery	C481-C482
Other Digestive Organs	C268-C269, C488
Respiratory System	
Nose, Nasal Cavity and Middle Ear	C300-C301, C310-C319
Larynx	C320-C329
Lung and Bronchus	C340-C349
Pleura	C384
Trachea, Mediastinum and Other Respiratory	C339, C381-C383, C388, C390, C398, C399
Bones and Joints	C400-C419
Soft Tissue including Heart	C380, C470-C479, C490-C499
Skin excluding Basal and Squamous	
Melanoma of the Skin	C440-C449
Other Non-Epithelial Skin	C440-C449
Breast	C500-C509

Source: <http://seer.cancer.gov/siterecode>

Appendix D: SEER incidence site analysis categories (Continued)

Female Genital System	
Cervix Uteri	C530-C539
Corpus and Uterus, NOS	
Corpus Uteri	C540-C549
Uterus, NOS	C559
Ovary	C569
Vagina	C529
Vulva	C510-C519
Other Female Genital Organs	C570-C589
Male Genital System	
Prostate	C619
Testis	C620-C629
Penis	C600-C609
Other Male Genital Organs	C630-C639
Urinary System	
Bladder	C670-C679
Kidney and Renal Pelvis	C649, C659
Ureter	C669
Other Urinary Organs	C680-C689
Eye and Orbit	C690-C699
Brain and Other Nervous System	
Brain	C710-C719
Cranial Nerves Other Nervous System	C710-C719 C700-C709, C720-C729
Endocrine System	
Thyroid	C739
Other Endocrine including Thymus	C379, C740-C749, C750-C759
Lymphoma	
Hodgkin Lymphoma	
Hodgkin - Nodal	C024, C098-C099, C111, C142, C379, C422, C770, C779
Hodgkin - Extranodal	All other sites
Non-Hodgkin Lymphoma	
NHL - Nodal	C024, C098-C099, C111, C142, C379, C422, C770, C779
NHL - Extranodal	All sites except C024, C098-C099, C111, C142, C379, C422, C770, C779, C780-C789
Myeloma	
Leukemia	
Lymphocytic Leukemia	
Acute Lymphocytic Leukemia	
Chronic Lymphocytic Leukemia	
Other Lymphocytic Leukemia	C420, C421, C424
Myeloid and Monocytic Leukemia	
Acute Myeloid Leukemia	
Acute Monocytic Leukemia	
Chronic Myeloid Leukemia	
Other Myeloid/Monocytic Leukemia	
Other Leukemia	
Other Acute Leukemia	
Aleukemic, Subleukemic and NOS	C420, C421, C424 C760-C768, C809 C420-C424 C770-C779

Source: <http://seer.cancer.gov/siterecode>

Appendix E: SEER Cancer Cause of Death Analysis Categories

Cancer Causes of Death	ICD-10
All Malignant Cancers	C00-C97
Oral Cavity and Pharynx	
Lip	C00
Tongue	C01-C02
Salivary Gland	C07-C08
Floor of Mouth	C04
Gum and Other Mouth	C03, C05-C06
Nasopharynx	C11
Tonsil	C09
Oropharynx	C10
Hypopharynx	C12-C13
Other Oral Cavity and Pharynx	C14
Digestive System	
Esophagus	C15
Stomach	C16
Small Intestine	C17
Colon and Rectum	
Colon excluding Rectum	C18, C26.0
Rectum and Rectosigmoid Junction	C19-C20
Anus, Anal Canal and Anorectum	C21
Liver and Intrahepatic Bile Duct	
Liver	C22.0, C22.2-C22.4, C22.7, C22.9
Intrahepatic Bile Duct	C22.1
Gallbladder	C23
Other Biliary	C24
Pancreas	C25
Retroperitoneum	C48.0
Peritoneum, Omentum and Mesentery	C45.1+, C48.1-C48.2
Other Digestive Organs	C26.8-C26.9, C48.8
Respiratory System	
Nose, Nasal Cavity and Middle Ear	C30-C31
Larynx	C32
Lung and Bronchus	C34
Pleura	C38.4, C45.0+
Trachea, Mediastinum and Other	C33, C38.1-C38.3, C38.8, C39
Bones and Joints	C40-C41
Soft Tissue including Heart	C47, C49, C38.0, C45.2+
Skin excluding Basal and Squamous	
Melanoma of the Skin	C43
Other Non-Epithelial Skin	C44, C46+
Breast	C50
Female Genital System	
Cervix Uteri	C53
Corpus and Uterus, NOS	
Corpus Uteri	C54
Uterus, NOS	C55
Ovary	C56
Vagina	C52
Vulva	C51
Other Female Genital Organs	C57-C58

Source: <http://seer.cancer.gov/codrecode>

Appendix E: SEER Cancer Cause of Death Analysis Categories (Continued)

Male Genital System	
Prostate	C61
Testis	C62
Penis	C60
Other Male Genital Organs	C63
Urinary System	
Bladder	C67
Kidney and Renal Pelvis	C64-C65
Ureter	C66
Other Urinary Organs	C68
Eye and Orbit	C69
Brain and Other Nervous System	C70, C71, C72
Endocrine System	
Thyroid	C73
Other Endocrine including Thymus	C37, C74-C75
Lymphoma	
Hodgkin Lymphoma	C81
Non-Hodgkin Lymphoma	C82-C85, C96.3
Myeloma	C90.0, C90.2
Leukemia	
Lymphocytic Leukemia	
Acute Lymphocytic Leukemia	C91.0
Chronic Lymphocytic Leukemia	C91.1
Other Lymphocytic Leukemia	C91.2-C91.4, C91.7, C91.9
Myeloid and Monocytic Leukemia	
Acute Myeloid	C92.0, C92.4-C92.5, C94.0, C94.2
Acute Monocytic Leukemia	C93.0
Chronic Myeloid Leukemia	C92.1
Other Myeloid/Monocytic Leukemia	C92.2-C92.3, C92.7, C92.9, C93.1-C93.2, C93.7, C93.9
Other Acute Leukemia	C94.4, C94.5, C95.0
Aleukemic, Subleukemic and NOS	C90.1, C91.5, C94.1, C94.3, C94.7, C95.1, C95.2, C95.7, C95.9
Mesothelioma (ICD-10 only)+	C45+
Kaposi Sarcoma (ICD-10 only)+	C46+
Miscellaneous Malignant Cancer	C26.1, C45.7+, C45.9+, C76-C80, C88, C96.0-C96.2, C96.7, C96.9, C97

Source: <http://seer.cancer.gov/codrecode>

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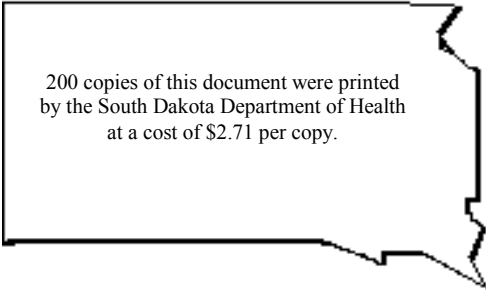
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